May 31, 1930 *A McGraw-Hill Publication* 25 Cents per Copy

AVIATION

The Oldest American Aeronautical Magazine

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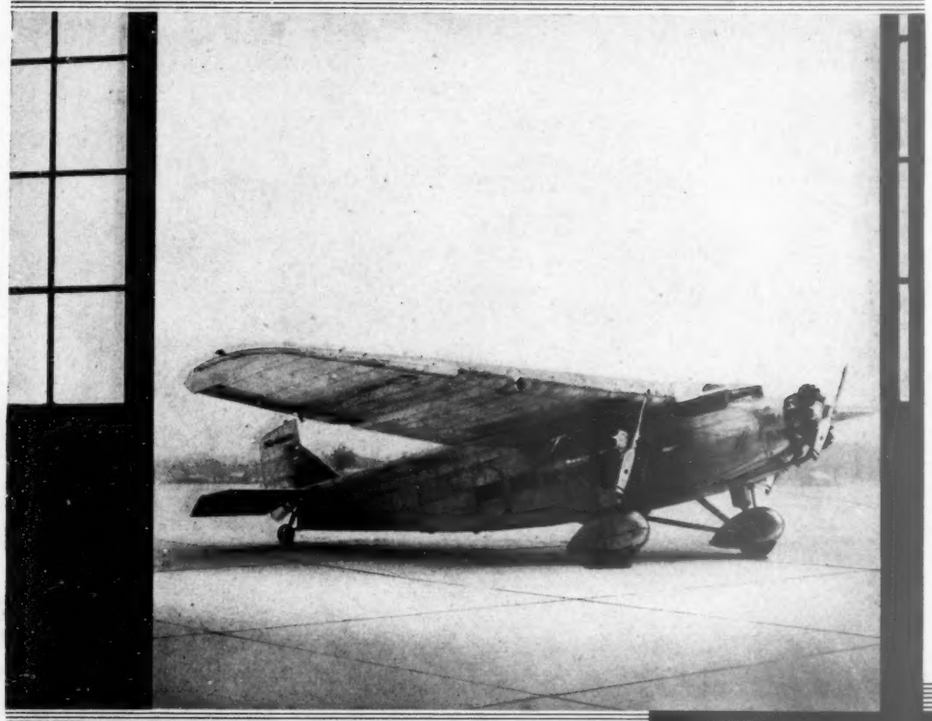
OPERATING IN THE *Polar Regions*

By Captain Sir Hubert Wilkins

TRAINING COMMERCIAL PILOTS IN *Germany*

THE *Small Dealer's* PROBLEMS

. . . ALOFT IN LUXURY



Like an albatross of burnished silver . . .
the new Ford de luxe club plane

THE NEW Ford all-metal, tri-motored club plane meets delightfully all the demands of the most exacting yachtsman of the skies. Fundamentally it is designed as close to mechanical perfection as possible, with all the strength and extraordinary performance ability for which Ford planes are famous. This great new plane permits you to forget the mechanics of flight. It gives you the freedom, the exhilaration, the full joy of sailing at will across the skies in club comfort.

Beautiful as a jewel, it spreads its wings like burnished silver, to fly with the grace of an albatross over sea, over land, over deserts or arctic wastes. Here, truly, is a yacht to be proud of! Here, above all things, is the worthy vehicle of the modern man of spirit and imagination!

FORD MOTOR COMPANY

Visitors are always welcome at the Ford Airport at Detroit

New de luxe club plane

Mechanical features are similar to those of the famous Ford 5-AT: Built of aluminium alloys, lighter than wood; powered with three Pratt & Whitney air-cooled motors, with total of 1275 horse-power; a capacity of nine passengers plus a pilot and mechanic. Cruising speed over 115 miles an hour, for hundreds of miles!

In addition, the de luxe club plane contains kitchenette, folding berths, radio cabinet, writing desk and book case. Seven overstuffed chairs and a two-place divan. Card tables and serving trays. Refrigerators and thermos cases. A lavatory with toilet, running water, towel racks, and closets for luggage, guns, fishing tackle or golf sticks.

Walls and ceiling are sound-proofed.

The entire interior is beautifully trimmed and decorated, in choice fabrics. Individual ventilation at each window. Dome and wall light and heat register in floor add to the comfort and luxuriousness of the plane. Tile walls in kitchenette and lavatory.

The pilot and mechanic in their forward control cabin have every mechanical device necessary for day or night flying in all seasons under all conditions.

Price on request.

The convenience of a luxurious yacht

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Associate Editor

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Pacific Coast Editor

AVIATION

The Oldest American Aeronautical Magazine

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JOHN T. NEVILL
Detroit Editor

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COMING

¶Signing up the Business Market. ¶The Canadian Air Mail. ¶Short Haul Air Ferries. ¶Coming descriptions—the Curtiss Condor, Savoia-Marchetti amphibion.

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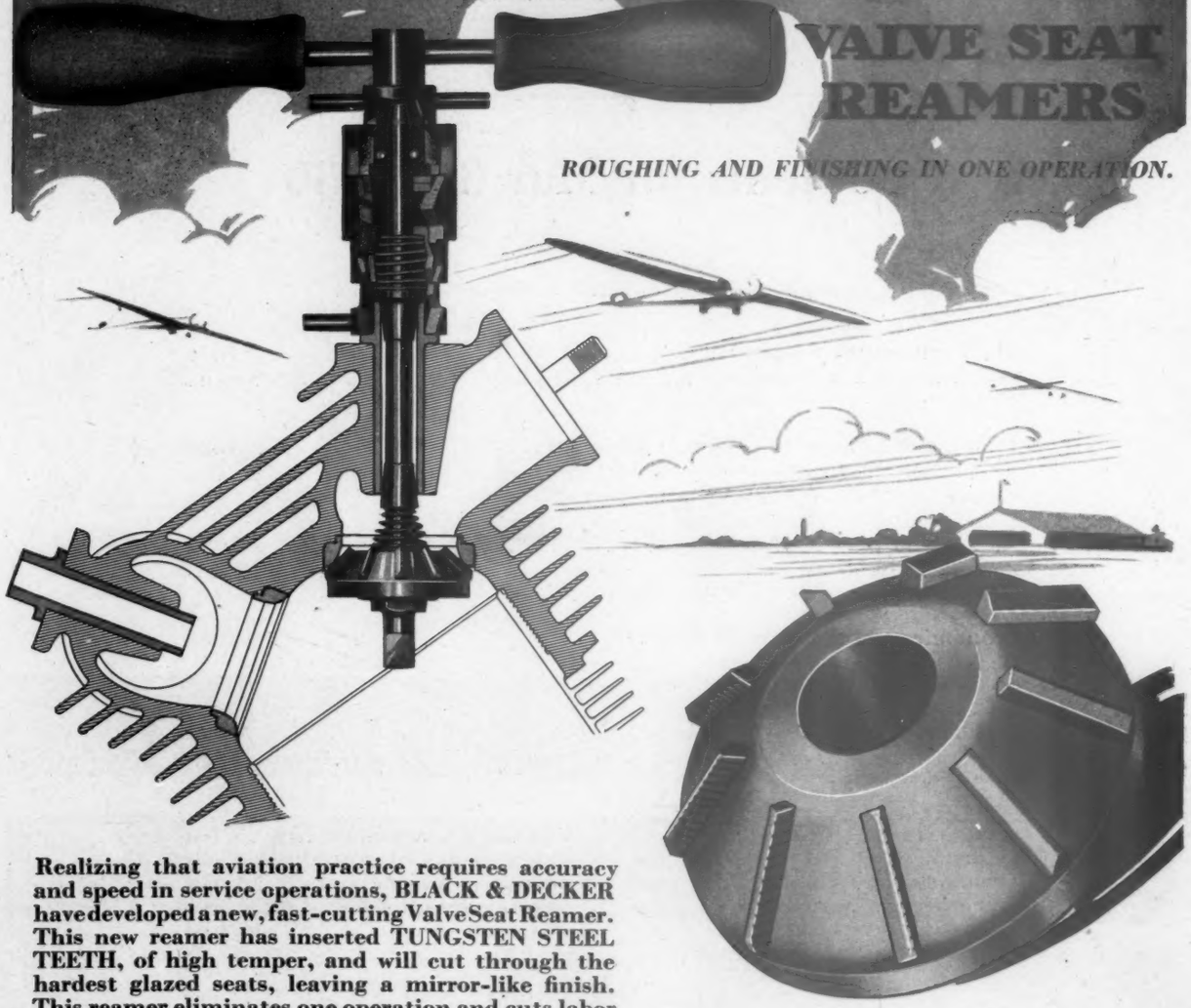
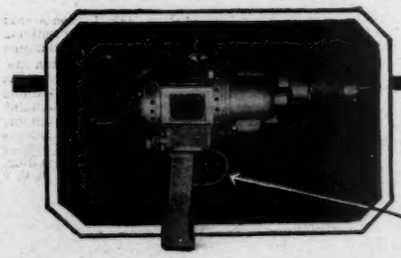


Realizing that aviation practice requires accuracy and speed in service operations, BLACK & DECKER have developed a new, fast-cutting Valve Seat Reamer. This new reamer has inserted TUNGSTEN STEEL TEETH, of high temper, and will cut through the hardest glazed seats, leaving a mirror-like finish. This reamer eliminates one operation and cuts labor time in half, at no sacrifice of accuracy or quality of work.

When used with the BLACK & DECKER Self-Centering Pilot, extreme accuracy is assured. Because of centering cones on this pilot, valve seat is cut truly concentric to the running center of guide and gas-tight valve closure is certain.

BLACK & DECKER Reamers have tapered holes and may be used with standard makes of pilots.



Your Jobber has them

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TOWSON, MD.

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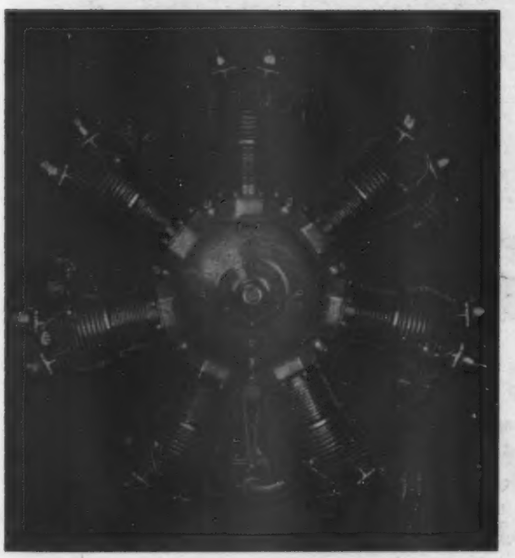
"With the Pistol Grip and Trigger Switch"

AXELSON AIRPLANE ENGINES

THE WINGED POWER

A WIDE MARGIN OF RESERVE QUALITY



Axelson standards of manufacture require the deliberate investment of many hours of extra production time in the manufacture of Axelson Engines. Details that are seemingly unimportant to the average manufacturer receive the same care and attention that must be given to the most vital parts. Every part is ground or machined to an absolutely accurate finish. The Axelson Engine will give you longer service and require less frequent overhaul. When an overhaul is necessary it can be accomplished most economically, due to simplicity of design and easy accessibility of every part.

AXELSON AIRCRAFT ENGINE CO.
Factory and General Offices,
Corner Randolph St. and Boyle Avenue, Los Angeles, California
(P. O. Box 337)

To Give New Impetus to Flight

Again, with the aircraft Diesel, Packard proves its right to the title, "Master Motor Builders"—and logically. The experience, talent and resourcefulness which, with the perfection of the Packard-Diesel, has revolutionized aircraft power was developed through the years in the designing and building of fine automobile engines. Compared to the difficulties presented in solving the great engine problem of the century, the finest car motor of today is elementary. So what greater assurance of supreme excellence could be asked by the automobile buyer than the Packard crest? It distinguishes that car of slender, graceful beauty and luxurious comfort, powered with the famous eight-in-line motor which has contributed most to Packard engineering leadership.

The PACKARD-DIESEL AIRCRAFT ENGINE

To a world already rapidly turning "air-minded," Packard introduces a supremely important engineering achievement, destined to give a new and tremendous impetus to flight.

Packard, the designer and builder of more aircraft horsepower than any other manufacturer in America, now contributes to air transportation the far greater reliability, economy and safety of a radial *Diesel* Aircraft Engine.

THREE YEARS IN DEVELOPMENT

When the epochal flights of 1927 focused the attention of the world on the air-cooled engine and civilian aircraft began to exceed Army and Navy planes in hours and miles flown, motors of less power and lower cost were demanded by a vast new market.

Packard had foreseen this demand but did not care to add but another conventional gasoline engine to the long list of those available. Immediate profits held no lure. But the opportunity to make a truly noteworthy contribution to the science of flight was an attraction and a challenge to Packard engineering genius.

So, equipped with the finest of facilities, adequate resources, the best of materials and machinery and an engineering staff of unsurpassed ability and experience, Packard set out to accomplish "the impossible"—to adapt the *Diesel* principle to radial aircraft engines. The goal if achieved was worth the years and millions it would cost, for the engineering world had long known that the Diesel engine was the *ideal* aircraft power plant. But Packard, in 1927, was embarking upon a course strewn with the wreckage of others' failures. What the engineering talent of the world said could not be done, Packard confidently undertook. And Packard has succeeded brilliantly.

A PACKARD TRIUMPH

In the Packard-Diesel engine Packard has for all time eliminated the principal causes of motor failure. It can almost be said that, like the simple, old water-wheel which had to run as long as water flowed over it, the Packard-Diesel must run as long as fuel flows to its cylinders. For the Packard-Diesel has no carburetor, no magnetos, no spark plugs. It has but one instead of two or more valves per cylinder. Each cylinder has an individual fuel pump, making it an independent operating unit. The fuel is ordinary furnace oil fired spontaneously by the heat of the compressed air in each cylinder.

There are three major advantages. *Greater reliability* because of extreme simplicity of design. *Greater economy* because of lower fuel cost plus lower fuel consumption, the latter permitting greater pay loads with longer range of flight. *Greater safety* because the fire hazard is removed through the use of *fire-safe* fuel, and the absence of electrical ignition equipment.

These three advantages mark *the greatest advance in aircraft power* in the history of aviation! Designers and builders of aircraft have been quick to appreciate them—operators and pilots have shown enthusiastic interest. Already the Packard-Diesel engine is offered as optional equipment on the following planes—Ford Tri-Motor, Ryan, Stinson, Verville and Eastman Flying Yacht.

After exacting tests by the United States Army, the Department of Commerce has approved the Packard-Diesel (Certificate No. 43) with an official rating of 225 horsepower. With a weight of 510 pounds this means *but 2.26 pounds per horsepower*. Packard has written a new chapter in the annals of air transportation.

PACKARD

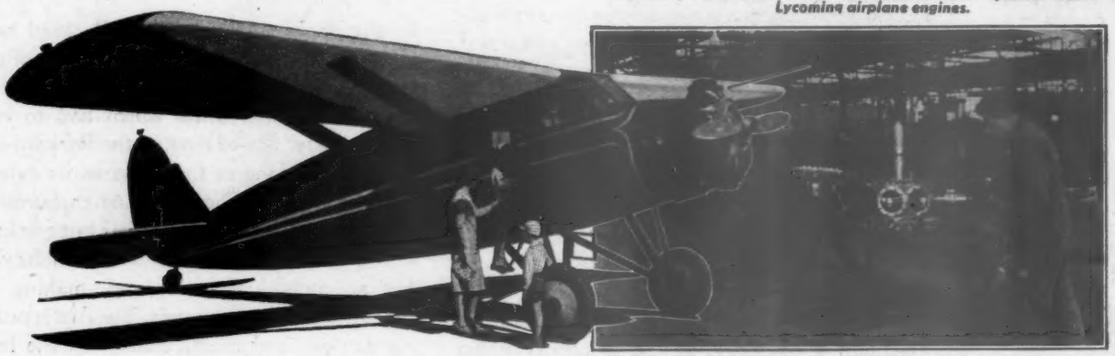
ASK THE MAN WHO OWNS ONE

STINSON

210 H. P. LYCOMING 4-Place Cabin Plane $5775

with Electric Self Starter

Especially built Auto Turret Lathe which turns cylinder heads for Lycoming airplane engines.



In the last stage of assembly. After motor is assembled it is put on testing block, run for five hours and taken down for inspection; then reassembled and again tested before ready for delivery.

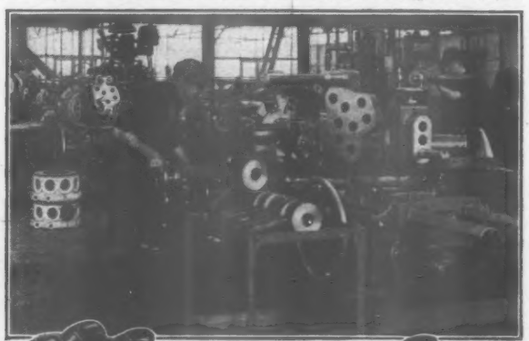
IT PAYS TO BE FIRST

Stinson was first in 1926 with a completely enclosed cabin plane capable of flying itself in the air, equipped with brakes, heater and starter. Stinson is first today with a plane of value and price possible only when vast production resources, financial strength, experienced management and great buying power are concentrated upon the building and marketing of better planes for new, radically low prices. Stinson offers dealers even more than a plane that has no competition. Stinson creates public demand for private ownership of planes, opens vast new markets, makes it easier to buy a plane, makes it easy to learn to fly, and builds a permanent, profitable business. One of the important reasons that Stinson enjoys unquestioned leadership today is the fact that it controls the source of Lycoming engines. The reliability of Lycoming engines is a guarantee of the future possibilities of this organization. The Stinson management is backing its faith in *aviation as a business* with manufacturing plans, production provisions, and investments that dwarf all previous efforts.

***DEALER** franchise still open for right men in some localities.*

Stinson Aircraft Corporation, Wayne, Michigan
Division Cord Corporation

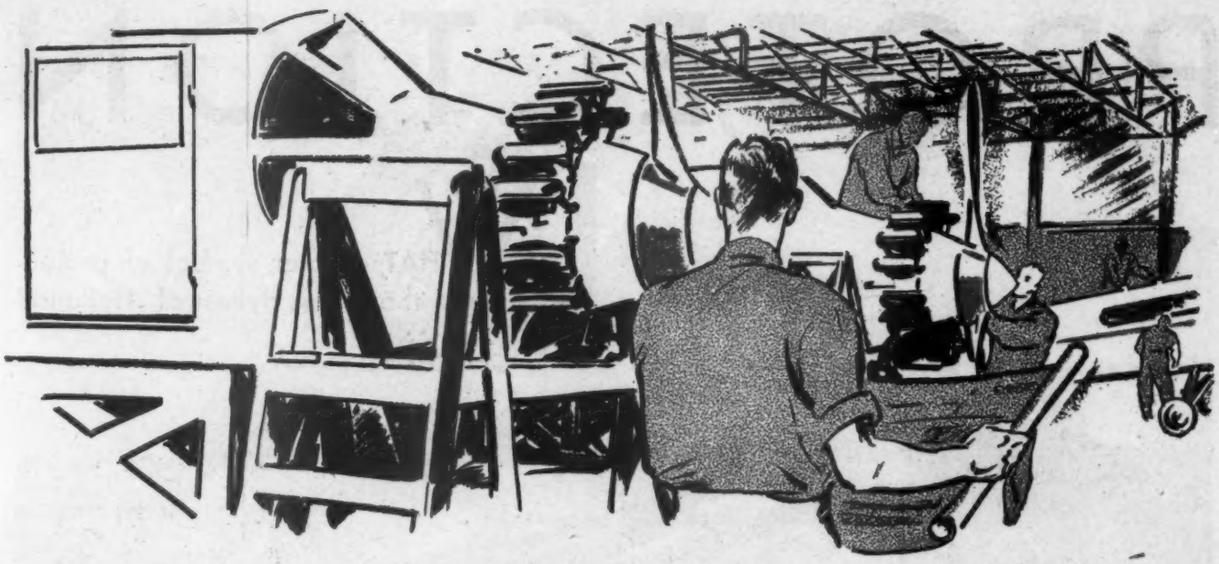
Below—Special Lathe, for facing master rods. Work performed as finely as metal can be finished. Lathes further down are facing crank cases.



Three-fourths front view of the 9-cylinder Lycoming Radial Aircraft engine, the R-680. Smoothness and quietness of operation have been developed to a high degree.

Three-fourths rear view of the Lycoming Aircraft engine. Lycoming has spent more than two years in developing this engine with reliability as the basis in every factor of design.

4-Pass.—225 H. P. Wright—$8,495 · 4-Pass.—225 H. P. Packard Diesel—$8,995 · 4-Pass.—300 H. P. Wright—$10,495—300 H. P. Wasp—$10,695 · 6-Pass.—300 H. P. Wright—$10,995—300 H. P. Wasp—$11,195 · 8-Pass.—425 H. P. Wasp—$15,995 · Stinson Airliner—10-Pass. Tri-Motored Transport, $23,900 · Prices F. O. F. Wayne, Michigan · Equipment other than standard, extra.



Aircraft lubrication must be as scientifically exact as aircraft design!

Hand in hand with the remarkable advance in engineering knowledge and airplane design, has been the development of scientific aviation lubrication under the leadership of the Vacuum Oil Company.

Since the early days of the Wright Brothers, Mobiloil has been the outstanding choice both for especially hazardous flights and for day in and day out air travel.

As the science of aviation has developed, Mobiloil has developed too. Constant research by trained engineers, thorough engine study, new manufacturing processes have all contributed to the perfection of today's "double-range" Mobiloil Aero Oils. Their quality and dependable performance can be predicted with scientific accuracy.

In Mobiloil Aero Oils lubrication precision for aircraft engines reaches a scientific exactness equalled only by the exactness of modern airplane design.

Mobiloil Aero Oils are on sale at established airports throughout the world.

VACUUM OIL COMPANY

Makers of high-quality lubricants for all types of machinery

GARGOYLE

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AERO OILS

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WHAT greater symbol of protection than the dykes of Holland?

UDYLITE is the electrolytic application of pure cadmium to base metals for protection against rust

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UDYLITE PROCESS COMPANY

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Vast lands formerly lain barren and desolate by the onrushing waters are now fertile and productive agricultural regions.

Again man's ingenuity has conquered!

So, too, far visioned manufacturers have conquered the bugbears of rust and corrosion. They are protecting their products by the Udylite Process, the simplest, most efficient and best cadmium plating process.

UPC

THE ONE METAL THAT FLIES BEST

—One third the weight of iron or steel
—Strength up to 55,000 lbs. per square inch
—Easily forged, stamped, cast or extruded

ALCOA ALUMINUM

THE ONE METAL THAT FLIES BEST

Materials help to sell the plane

Alcoa Aluminum can help you, not only in plane construction, but in selling—and selling is one of the knottiest problems in the airplane industry today.

The reasons why you used Alcoa Aluminum in your plane construction will interest your prospects, aid in closing sales.

Take propellers, for instance. The life of a wooden propeller is counted in hundreds of hours—aluminum propellers in thousands of hours. In fact no modern propeller forged of the light, strong Alloys of Alcoa Aluminum has ever worn out.

The light, strong Alloys of Alcoa Aluminum are, roughly, ten times as strong as wood. They will not shatter or splinter. Parts forged of these light, strong Alloys can be made with tensile strengths up to 55,000 pounds per square inch, yet they weigh less than ½ as much as iron or steel.

Alcoa Aluminum and its Alloys are now used for hundreds of plane parts—wings, fuselage and motor. They can be forged, cast, drawn or extruded. They stay bright and are highly resistant to corrosion. Our engineers will gladly give you full data on the use and ease of fabrication of the light, strong Alloys of Alcoa Aluminum in aircraft. Address ALUMINUM COMPANY *of* AMERICA; 2482 Oliver Building, PITTSBURGH, PENNSYLVANIA.

ALCOA ALUMINUM

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MONEY TO YOUR AIRPORT

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You can afford to borrow money for your paving . . . it will pay you back many fold. It will attract more fliers, more mail and transport business, more visitors. It will keep your revenues up during bad weather when other ports are closed down—inaccessible. It will make your concessions more valuable. It eliminates even the thought of danger in landings and take-offs.

Airport paving can be done at moderate cost with Tarmac. Let us tell you how it is used, and what it would cost on your port. Of course, this will not obligate you in any way. Write our Pittsburgh office for information.

AMERICAN TAR PRODUCTS COMPANY
Division of The Koppers Company
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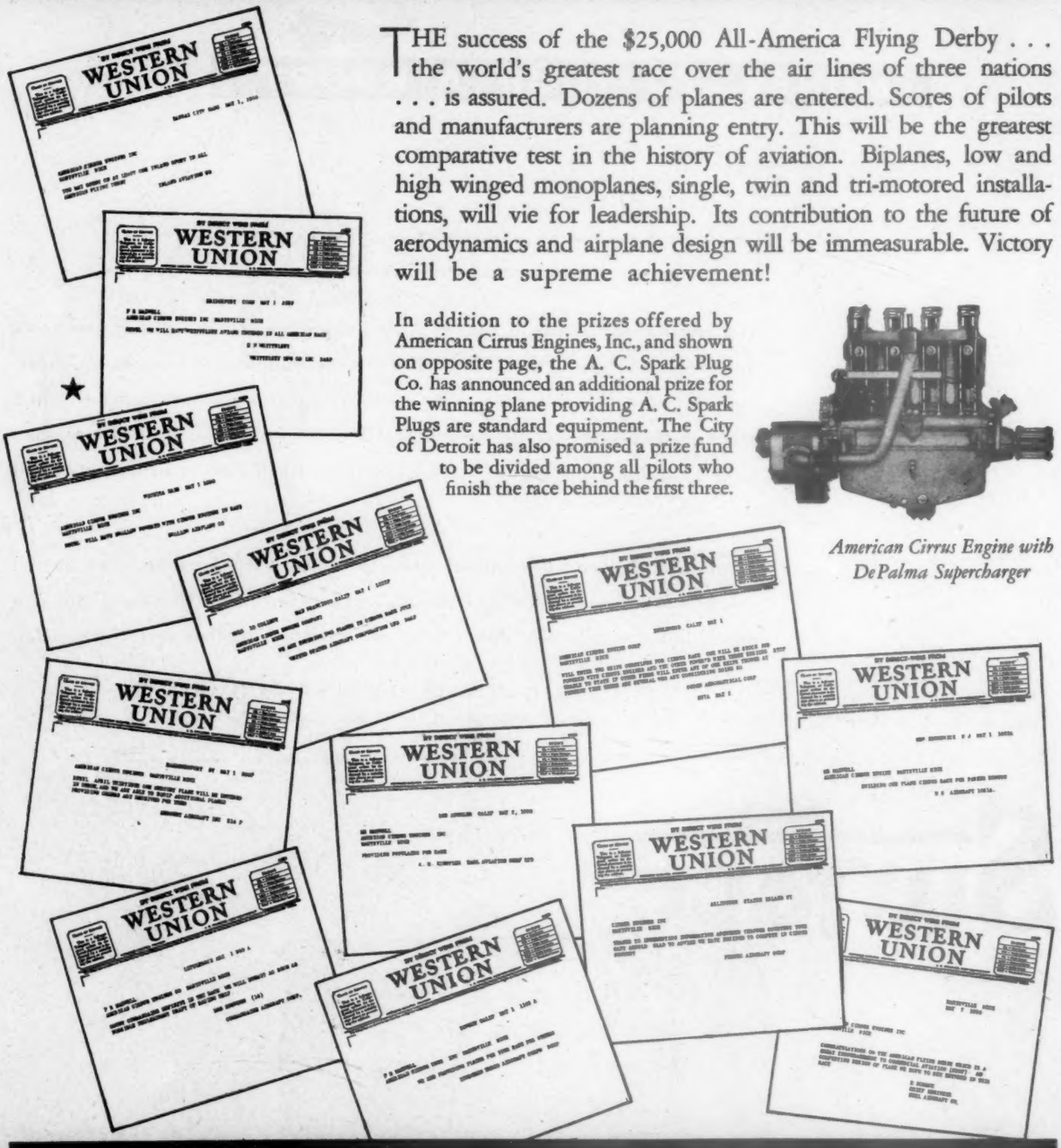
ALL FACES UP! THE STARTING GUN IS READY . . .

ANOTHER CIRRUS ACHIEVEMENT



THE success of the $25,000 All-America Flying Derby . . . the world's greatest race over the air lines of three nations . . . is assured. Dozens of planes are entered. Scores of pilots and manufacturers are planning entry. This will be the greatest comparative test in the history of aviation. Biplanes, low and high winged monoplanes, single, twin and tri-motored installations, will vie for leadership. Its contribution to the future of aerodynamics and airplane design will be immeasurable. Victory will be a supreme achievement!

In addition to the prizes offered by American Cirrus Engines, Inc., and shown on opposite page, the A. C. Spark Plug Co. has announced an additional prize for the winning plane providing A. C. Spark Plugs are standard equipment. The City of Detroit has also promised a prize fund to be divided among all pilots who finish the race behind the first three.

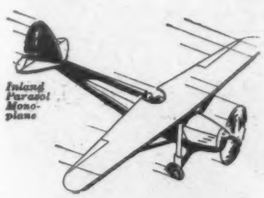
American Cirrus Engine with DePalma Supercharger

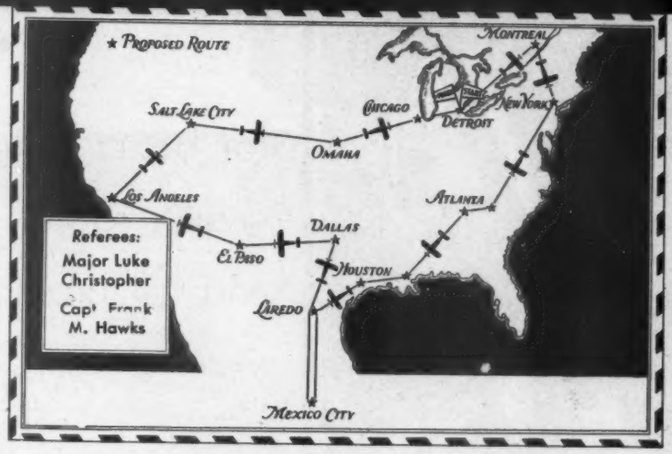
AMERICAN CIRRUS ENGINES, INC.

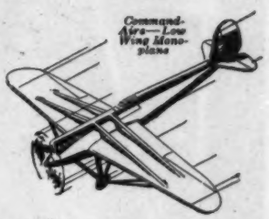
★ **The following plane manufacturers have already entered planes for the race: United States Aircraft Corporation, Ltd.; Eyerly Aircraft Corporation; Whittelsey Manufacturing Co., Inc.; U. S. Aircraft; Fernic Aircraft Corporation; Great Lakes Aircraft Corporation; Earl Aviation Corporation, Ltd.;**

THE NATION WILL SOON LOOK SKYWARD TO

IN THE AIR



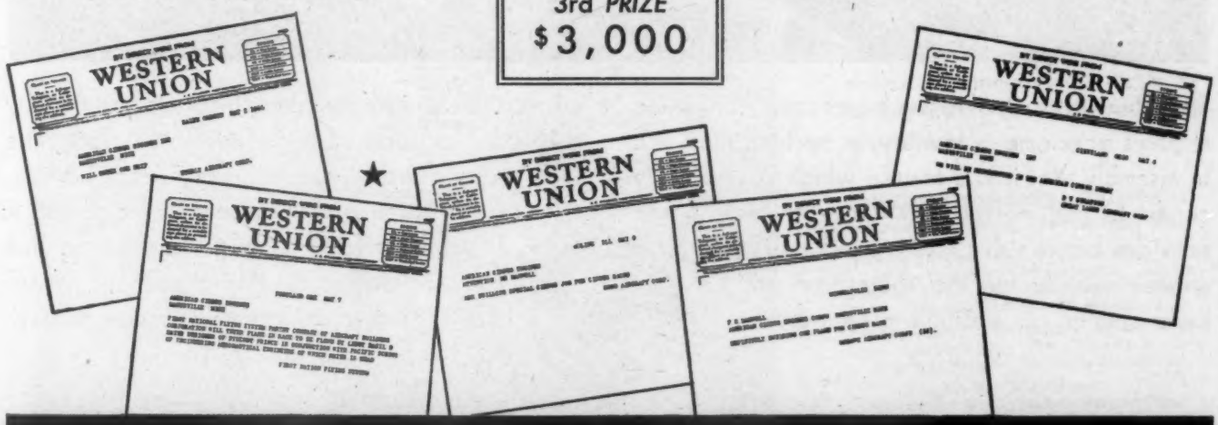




Planes illustrated are typical of types already entered for race

The winning of this race will undoubtedly be a matter of minutes, possibly seconds. The utmost care in preparation is highly desirable. We strongly urge that all pilots test their planes most thoroughly; that they run the engine in the particular installation they intend to use for at least 25 hours before starting. Every detail of installation must be correct; every engine should be thoroughly seasoned. This is the world's greatest race with the world's greatest list of entries. It will prove the world's greatest contribution to contemporary aeronautics. Pilots are urged to place their orders at once.

1st PRIZE
$15,000
2nd PRIZE
$7,000
3rd PRIZE
$3,000



MARYSVILLE, MICHIGAN . . . .

★ **Buhl Aircraft Company; Mercury Aircraft Inc.; Mohawk Aircraft Corporation; Inland Aviation Company; Commandaire Aircraft Corporation; Ogden Aeronautical Corporation; Lundgren Emsco Aircraft Corporation; Swallow Airplane Company; First National Flying System; Mono Aircraft Corporation**

INTEGRAL-CAST ROCKER BOXES

•

for better valve cooling, greater rocker arm security and full protection from weather . . . . . .

The integral casting of rocker boxes costs money and requires more time in foundry, in machine shop and in assembly. Yet it is a feature which you naturally expect to find in Pratt & Whitney engines. Its use provides better valve cooling and insures greater security for the rocker arm and valve springs. In addition integral casting protects these essential parts from the weather by making it possible completely to enclose the valve gear, guarding against snow, sleet and rain.

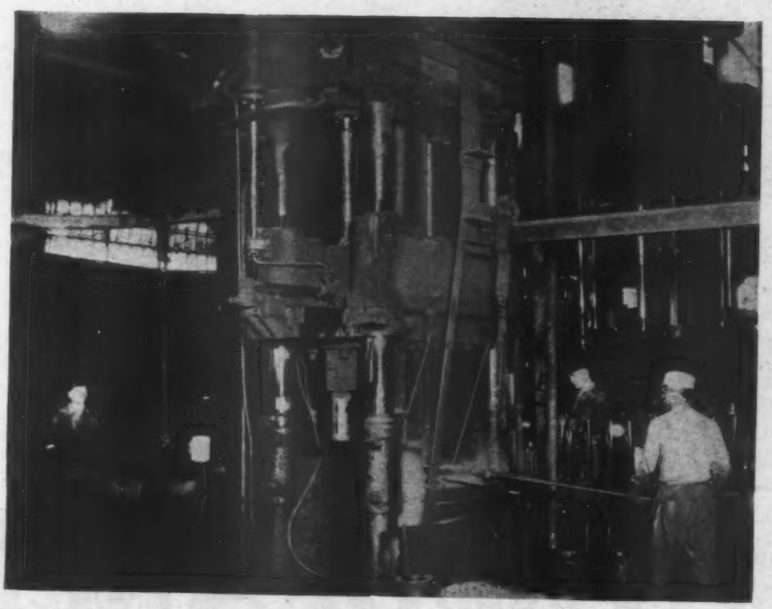
This construction is only one of dozens of Pratt & Whitney features which contribute that dependability for which the famous "Wasp" and "Hornet" engines are universally known.

THE PRATT & WHITNEY AIRCRAFT CO
HARTFORD - - - CONNECTICUT
Division of United Aircraft & Transport Corporation

Wasp & Hornet *Engines*

Manufactured in Canada by Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, P. Q.; in Continental Europe by Bavarian Motor Works, Munich; in Japan by Nakajima Aircraft Works, Tokio.

Cylinder Forgings



»MADE BY THE PRESS-FORGE METHOD

»MADE BY THE UPSETTER METHOD

THE engine builder finds at Bethlehem unexcelled facilities for the production of airplane cylinder forgings.

He has the choice of either press or upsetter forgings, as Bethlehem is equipped for both methods. He has the satisfaction of knowing that Bethlehem makes his cylinder forgings complete, carrying out every step from the ore to the finished product, under expert metallurgical supervision. He has the advantage of purchasing these forgings from an organization able to draw on a vast amount of experience in the manufacture of airplane cylinders. During the past ten years Bethlehem has supplied more than 100,000 airplane cylinder forgings to representative engine builders.

Bethlehem furnishes airplane cylinder forgings either rough-as-forged, or rough-machined; annealed, normalized, or fully heat-treated; in large or small quantities.

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Bethlehem Steel Export Corporation, 25 Broadway, New York City

BETHLEHEM

Haskelite played its part in setting the endurance record held by the St. Louis "Robin"

PLYWOOD
HASKELITE
PLYMETL

ENDURANCE

There is nothing like an endurance flight to show up "bugs" in airplane parts and materials.

It is a real indication of the stamina of Haskelite, therefore, that practically every endurance record-breaking plane in the United States has been equipped with this blood-albumin glued plywood. Write for engineering data.

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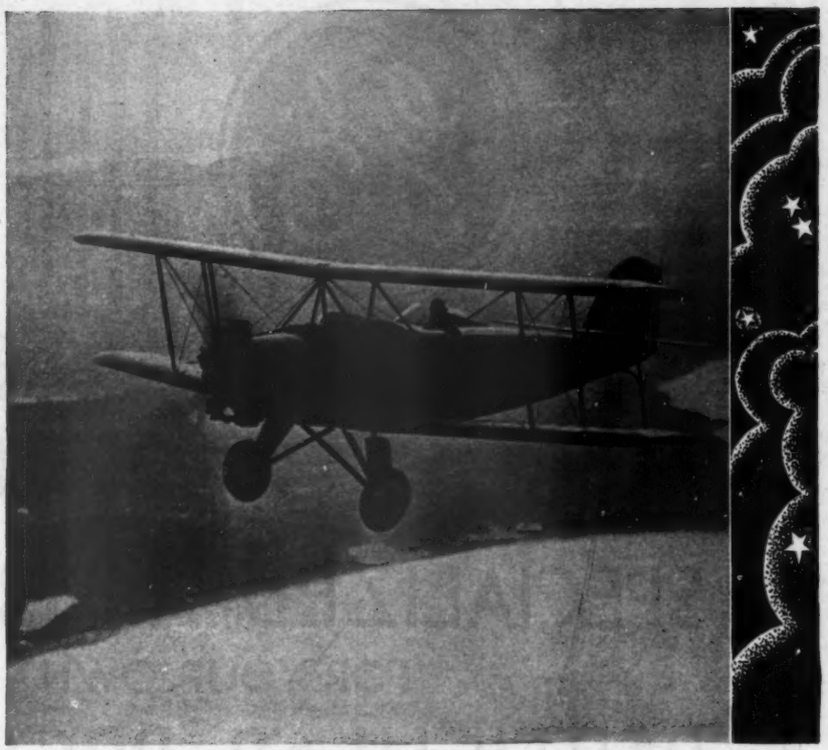
TRAVEL BY AIR
AUTHORIZED
U.S. AIRMAIL
DEPT. OF COMMERCE

A5-31Gray



THE KITTYHAWK

. . . A Land Plane or A Sea Plane

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AVIATION

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Flying Flag Pole Sitters

IN KEEPING with the celebration of the anniversary of Lindbergh's most famous flight, come the usual reports of attempts soon to be made to do more or less the same thing. For some unknown reason the Atlantic Ocean holds more attraction for airmen than a bargain sale holds for the American housewife.

We can, to a certain extent, appreciate the desire of some pilots, whose names have not yet found the front page, to go forth and conquer the weather above the North Atlantic. To them it appears like opportunity for fame, such as it may be. To them it is a chance (a very slim one) to be recorded in history as being among the immortals of aviation. To them it probably looks like a sporting chance that is worth the taking. They are young and some of them do not know any better, but they have that misguided enthusiasm and determination which may carry them through.

However, what we cannot understand or comprehend is the desire of famous pilots to emulate Lindbergh's flight. They are men who are wealthy in experience. They know the cost, the loss and the profit. They have already made famous flights, and while making those flights they were undoubtedly spurred on by the thoughts of what their achievements would contribute to the progress of aeronautics. They were pioneers pushing out the frontiers of the aviation world. They successfully chanced their all and by their courage and ability, aviation has benefited to an extent that is beyond our power to picture in words.

Why, then, must they who contributed so much to progress risk their lives on ventures which will not contribute anything new? And if that silent voice within them still eggs them on, why must they use equipment that is old and tried, though good it still may be?

For many hours they have sat in their respective cockpits and more or less accurately determined the capabilities of their craft. They may know it from prop to tailskid. They may possess 100 per cent confidence in the ability of their craft to "make the grade." Perhaps in their own minds the flight is already made and the rest is mere routine.

But what of that? Supposing they do cross that alluring body of water, what will they gain? What will they prove? And what will they contribute? We feel that the general answer is . . . . very little, if anything. If they land in New York they may get a free ride up Broadway and be congratulated by the Mayor. It will be in the newspapers for perhaps a day or two, but as a matter of fact, the printed publicity will fall far short of that which they received for previous flights. Their gains will also be far less than that which they have already received and their flights will not prove a thing which is not already known. We know and the public knows that the North Atlantic can be crossed by air. We know and the public knows that the east-west crossing is more hazardous than the west-east trip. Both flights have already been made and all worthwhile data on planes and engines of the types to be used have been collected. So, even success would not contribute a thing to aeronautical progress.

On the other hand, if the flights fail, the cost and the loss will probably never be known. There is no machine or mathematical process by which we can calculate the effect that failure and death will have upon the minds of those whom the industry is desperately striving to educate to the value of the airplane in daily life. Not least of all will be thoughts in the minds of the public that, once again, famous airmen have taken the long trail; that flying seems destined to take its toil eventually; that men who contributed so much have they themselves turned daredevil, and perhaps a bit haywire.

For years we of the industry have talked ourselves

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blue in the face about aviation. We have taken every manner of means to prove to the man in the street that the airplane is for him; that it is a new and better method of transportation for him, and that it is to his advantage to regard it as such and act accordingly. We have pointed out the progress of aeronautical development made possible by the courage and ability of our famous airmen.

In short, we have succeeded in making the public airminded to a certain extent, and that extent includes the ability on the part of the public to distinguish between foolhardy and experimental flying. Unfortunately that knowledge can now act as a boomerang to aviation. How can we expect to consistently build up the public's confidence if our own history-makers place themselves in the light of half-baked pilots? And how can we expect to keep the public convinced that development is really going forward if those who so materially helped us to where we are today turn about and run the needless risk of being classed as fools.

Aeronautical development has taken a toll in lives of men and women and we must face the fact that experimental development will continue to take its toll in lives, but with an ever decreasing degree. That is nothing new; it is but the repetition of steamboat and steam-train history. And what is more, the major part of the public is not blind to that fact.

Therefore, why run the risk of undermining all the beliefs that air heroes, dead and alive, have instilled in the public? Why build up a house and then tear it down to be built again? If an aerial venture will contribute to aviation progress, then the risk involved may be considered as justified, but if the success of the venture contributes nothing the risk becomes doubled and the flight unjustified. Personal glory can be the only reward for such an achievement and that type of personal glory is to our mind comparable to the glory enjoyed by the gentleman who sits atop a flag pole.

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Government and Industry

TOWARD a branch of commerce, the government under which it lives may show itself friendly, hostile, indifferent, or all three in turn. Railroads were once the beneficiaries of solicitous attention and direct assistance from Washington, and then within a few years they became the object of an unwavering watchfulness the results of which bordered on persecution. The air lines may well go through the same experience at some time. So far they have nothing of which to complain. The executive and legislative branches of the Washingtonian organization have alike been sympathetic on the whole, despite sporadic individual senatorial outbreaks over accident publicity and other controversial themes. But that very fact makes it advisable, particularly with changes of governmental relations in early prospect, that the industry take stock.

What do we want Washington to do for us, and how? Two years ago American air transport liked to feel itself committed to, and freely accepting, the fundamental policy of getting along without direct subsidies. For foreign lines, both in the Foreign Air Mail act as originally passed and in the airship ocean mail bill now under consideration, that policy has gone by the board. For domestic operation, the Watres bill for the first time frankly discards it, at least so far as certain passenger lines now endowed with mail contracts are concerned. What next?

European countries, more habituated than our own to the making of direct governmental grants to every sort of private undertaking that can pass as a public utility or as of national importance, seem with rare exceptions to have accepted the subsidy as a permanent feature of civil aviation. Four or five years ago, expressions of anticipation of its elimination were frequent. Now they are unusual. We do not believe that either the Congress and the people of the United States, nor the American aircraft industry, intend to resign themselves permanently to governmental nursing of commercial flying, at least in the domestic sphere. Certain measures of a temporary character have been, and still are necessary for assistance in what still continues to be a pioneering stage. Now is the time to make up our minds that they are temporary. Now is the time to decide just what form they should ideally take, how far they should go, and what courses we should pursue in moving toward their ultimate elimination. Upon that line, and with concrete and specific hopes of improvement held out for the future, the industry will have the maximum chance of getting from Congress, the executive departments, and perhaps from the several states, what is urgently required in the present.

The same applies to other forms of governmental intervention than the subsidy, and we should give consideration to possible activities and forms of assistance that have not so far been seriously considered in the United States—especially to "propaganda," both at home and abroad. Several European governments, for example, have sent or plan soon to send official or semi-official "missions" to South America. Direct American governmental activity on parallel lines has been confined to the despatch of a special aeronautical trade commissioner by the Department of Commerce. He, to be sure, should be a permanent feature. Perhaps the government should go further. We incline to favor a joint military and naval mission, a special tour by a couple of squadrons of personnel picked from both services for their linguistic and diplomatic qualifications as well as for their technical proficiency. Such squadrons should be furnished with mixed equipment, offering a good range of samples of the American industry's products, both military and

commercial. We can well afford it, and if it is properly done the aggregate benefit to the people of the United States will exceed any possible cost. The southern tours of Lieutenants Doolittle and Cuddihy, as well as many other American aerial ventures, have been of incalculable value both to the American industry and to our general relations to the south.

There remain kindred possibilities at home, but there we take the other side. The French Air Ministry has recently formulated a project, as yet unrealized, for a "caravan of civil aerial propaganda" to tour France. That the need is considered to exist is the best evidence of the extent to which truly commercial flying in the United States has outrun that in France and various other European countries, notwithstanding their splendid achievements in certain fields. In America, the Lindberg tour did that job once and for all, except as purely commercial ventures may become desirable and be organized by individual companies. At home the Department of Commerce has no need to propagandize, and to do so would be a futile diversion of effort. Abroad, the Department's efforts for the appreciation of American products should be unremitting, and the Army and Navy ought to participate. The industry has a right to expect liberal support in the export field, but the industry must cooperate in the government's effort and vigorously follow it up.

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For Air Transport Safety

WITH the subject of safety in air transport much to the fore in the public mind as a result of a number of bad accidents, it was to be expected that some quite definite action on the part of the government would result. It has arrived in the shape of a system of Certificates of Authority by which airlines, in effect, will be licensed in accordance with high standards of personnel, equipment and operating methods.

This rather radical step was taken not merely to satisfy the general desire for greater safety. There is a complication involved in the form of a much feared threat from certain members of Congress to have scheduled interstate air transport removed from the jurisdiction of the Department of Commerce and placed in the hands of the Interstate Commerce Commission. For various reasons the industry shudders whenever such a possibility pokes its head above the horizon and the Certificate of Authority system is designed to forestall any move in this direction.

We are in favor, of course, of anything which helps to widen the margin of safety, if it is reasonable in concept and application and does not impose an unfair burden upon any worthy company in a business which already has plenty to worry about. Secretary Clarence M. Young expects that the Certificate of Authority will bring about an era of safety in air transport which has never been experienced before in this country, and we most certainly hope this will be realized. Considerable improvement is the least we should anticipate from such a fundamental move in the field of federal air regulation.

The smaller companies not operating on the federal airways probably will experience the greatest difficulty in meeting the requirements. Just because the government has not got around to installing over a particular route the airway aids which it insists are necessary for safe operation, does not mean that one may go on operating without them. Whatever is necessary must be supplied, and if not by the government, then by individual company. This will mean some rather heavy investments in ground facilities here and there, but it will mean also that companies not adequately equipped or not soundly financed will be eliminated in the interest of public safety.

The Department of Commerce naturally stands to bear the chief burden imposed by the new regulation. This organization is assuming the task of establishing the minimum standards, and faces the responsibilities involved in forcing them. A difficult and delicate task lies ahead, involving considerable wisdom lest the meritorious but humble operator be trampled upon in the healthy business scramble where the bigger fellow always has the chance to be an intentional or unintentional bully. May the Department justify our confidence in its inherent fairness.

Although the application of the whole plan will mean a considerable narrowing down of the chances of things going awry in air transport operations, it should not be forgotten that it is a comparatively simple matter to regulate materials and methods in comparison with controlling problems of personnel. This may prove to be the most difficult aspect. Even when we surround a man's behavior with a set of regulations, and even if he is sympathetic toward them, there yet remains the tremendously important question of personal capacity.

Judgment is the epitome of the capacity of a person or an organization. It is born of all the attributes of personality, integrity, ability, and character. We have rather side-stepped certain personnel issues in times past but it should not be forgotten that transport work is a new industry within an industry, and that, speaking for the moment of the pilots alone, it should be recognized that there is to be developed a breed of transportation pilots with their particular characteristics, even as we have had a breed of military pilots.

Bad judgment has been the bugbear in the past and it may continue to be so, should the government, and the individual companies, fail to exercise courageous supervision under the provisions of the Certificate. We venture to predict that extra preseverance in this particular direction will accomplish most of what the new plan is designed to bring about.

THE PROBLEMS OF *Polar Flying*

Some Interesting High Lights on Sir Hubert Wilkins' Aerial

By Capt. Sir Hubert Wilkins

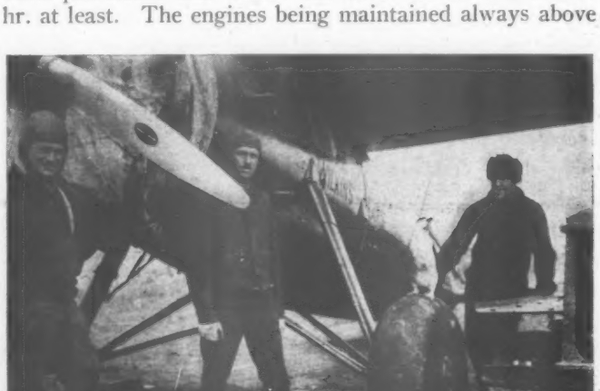
SOME seventeen years ago it dawned upon me as it eventually dawned upon others that it would be far easier and more economical to fly over certain routes than to use any other method of transportation. This applies particularly to the Polar Regions. I was confronted with the necessity on the Stefansson Arctic Expedition of tramping behind dog teams, caring for the dogs, and sometimes of dragging by human effort both dogs and sledges over the rough ice ridges. To fly would not only be much easier and more comfortable but, I believed, in the matter of geography, much more profitable. Yet there were difficulties in the way.

On my first long sledge journey I had frozen my nose and toes and fingers and I realized that neither humans nor machinery could be submitted to extreme temperatures with immunity. Subsequent experience taught me that it was an easy matter to protect ones self from the cold and reason assured me that it would be possible to protect the engines also. If we could insulate our sensitive bodies we could by means of insulation protect the engines required for flight. No one would reasonably expect an engine developed for use in normal temperatures to function well in a temperature of 50 deg. below zero. No one would expect the operators of those engines to expose themselves to such temperatures, and rather than get the engines to start and function in those conditions we chose to change the conditions immediately surrounding the engine.

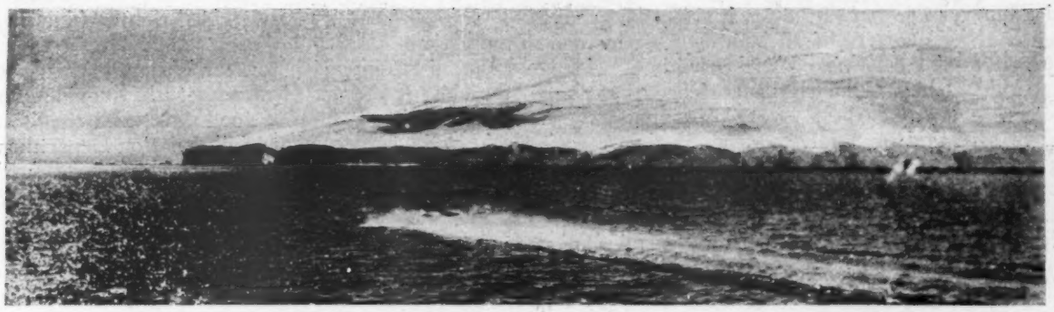
Once having realized that this could be done with insulation it was an easy matter to provide it. We could protect any sort of an engine from the cold and that was why we chose for our first Arctic Expedition two water-cooled Liberty engines and three air-cooled Wright Whirlwinds. The method of protecting both types was more or less the same. We provided extra close-fitting cowlings and controllable shutters. It might be interesting to note that I did my best to persuade the manufacturers to build for me the type of cowling now known as the N.A.C.A. but at that time—1925—neither firm supplying the material would allow me to use such a contraption on their machines. To keep the oil from cooling too rapidly we wrapped the oil lines and tanks with asbestos which was then taped and shellaced.

These methods together with the use of a double fabric cover—one, the inner, porous, and the outer, not waterproof but weather proof (there was no rain to contend with in the polar regions during the most suitable time for exploration) was all that was required to protect the engines while at rest. There is a good reason why the fabric covers should not be waterproof. If they are not porous the condensation of the warm air provided for heating the engine will form on the inside as it does on a rubber coat and the ignition wires will get damp and other parts of the machinery will rust.

The engines at work with suitable cowling will keep themselves warm enough and we found it advisable throughout the period of service, to always maintain the engines above freezing temperature. This was done mainly to protect it from the damage which might be caused by the difference in the coefficient of expansion of the metals used in its manufacture. The constant warmth was easily and economically provided, where electric service was not available, by hanging beneath the covers one or two ordinary hurricane lanterns which burn petroleum and which will burn unattended for 24 hr. at least. The engines being maintained always above



Four members of the second Wilkins Antarctic expedition. Left to right: Parker Cramer, Mr. Porter, Mr. Penguin and Al. Cheesman



The Lockheed taking off from beside the barrier on the second Antarctic expedition

Ventures into the Arctic and Antarctic Regions Are Told Here

freezing point were easily heated with a primus stove to working temperatures before attempting to start them. By heating the oil before pouring it into the tanks easy starting was assured. This never failed with the water-cooled or air-cooled single-engined machines but it did not always work with the three-engined air-cooled machine. It sometimes happened that one or other of the engines would balk after starting and then the others, idling, would cool to such an extent that the oil would not circulate. This meant a great deal of trouble, and it was the reason why after the first year of airplane exploration in the Arctic I chose to use single-engined machines.

LIGHTNESS of equipment was another great consideration. It is not a difficult matter to shelter a small machine which with its single engine and more efficient performance gave equal range. This was particularly true of the Lockhead Vegas used on our third Arctic Expedition and on our two expeditions to the Antarctic. Two men, at a pinch, could handle such a machine whereas it took several men to move the heavy and not more reliable three-engined machine. The question of reliability is of course debatable, and depends upon circumstances but as applied to the conditions we faced, where every available horsepower is needed to take off and keep the machine in the air there was not any additional factor of safety in a divided power plant, only a greater number of devices to go wrong.

Another thing to be considered was the cost and convenience of transportation to the base of operation. Big airplanes need big ships for transportation and extra work in disassembly and reassembly. We carried our Lockheed Vega from Spitzbergen to New York, from New York to the Antarctic and back to South America completely set up and ready for flight. This season, after flying for about 4,000 miles in the Antarctic, we launched our machine from the deck of the transport to the deep sea and flew to port, reaching it many hours ahead of the steamer. The steamer was delayed only twenty minutes from the time the order was given to stop the engines until it was at full speed ahead again. This could not have been done so expeditiously with a larger heavy plane.

Exploration by airplanes in the polar regions should not be considered only from the adventurers' point of view but also from the point of view of economy. Of course, if it is looked upon as a means of advertisement and publicity that is a horse of a different color, but when used for exploration the cost per mile of flight and the geographical results obtained should be looked into.

Because the financing of an expedition is a matter of public interest and as it is generally accomplished by means of public support I will give, roughly, the cost of our work, erring if at all on the extravagant side.

In the Arctic we flew a total distance of more than 1,500 miles and the cost of work for three years was less than $15,000—about $10 per mile. This cost included the purchase and transport of the machines by rail and steamer from New York to the base of operations and back again. Our two years' work and more than 6,000 miles of flying in the Antarctic cost about $60,000. In figuring the cost the value received from the sale of the used machines and equipment is deducted.

The cost per mile is not the only thing to be considered on a geographical expedition; the amount of new territory covered should be taken into consideration. In the Arctic, one-tenth of the distance covered, or 1,500 miles, was over territory never before seen by man. In the Antarctic twenty-five per cent of our flying was over country never seen before. It is difficult to estimate such territory in square miles but our Antarctic discoveries included 1,200 miles of new coast line, 14 new islands, many mountain peaks and glaciers, two channels, a wide, long strait and a new part of the Antarctic continent, not to mention in detail new sea areas where land was supposed to be. We have enabled geographers to push back the fringe of the antarctic continent by 7 deg. or as far as New York to Charleston, St. Louis to New Orleans or from Berlin to Geneva. As to the value of these discoveries, only time will tell.

BUT TO GET BACK to the problems of operation, I have referred to the cold and some part of the equipment. The light type of planes we used during the last three years eliminated a great deal of the difficulty experienced with skiis on big machines. We tried both wood and metal skiis, and for use on polar ice and snow I prefer those made of wood. The type we used were of my own design and made of one piece of hickory 10 in. wide, 9 ft. long and 1½ in. thick at the center of load. The bottom running surfaces were grooved in the center leaving an

inch and a quarter flat runway on each side; the groove at the center three quarters of an inch deep. This considerably increased the bearing surfaces without widening the tread. It has been my experience that long narrow, flexible skiis are best for polar regions where the snow is hard and granular. In the Arctic we took off with our Lockheed Vega plane from snow and ice with loads amounting to 300 lb. per sq.ft. of skii area.

In the Antarctic, unfortunately we could not find an accessible flat surface of any kind even half a mile long. The runway of volcanic ash, cinders and snow at Deception Island was only suitable for wheels and our flights in the south were made with either wheels or pontoons.

IN ORDER to be equipped for all conditions we were equipped with three sets of landing gear, pontoons, skiis and wheels. This year we had both ordinary and large sized tire-wheels. The extreme ranges required from our machines made it unwise and almost impossible to carry amphibian gear and there was no amphibian machine manufactured at the time we outfitted with the 3,200-mile range which we required. We used both wood and metal pontoons. The wooden pontoons were much heavier than those of metal and were therefore never used on long flights. The keels of both sets of pontoons were strengthened so as to make them safe for landings on snow or ice but as we were never obliged to land with pontoons on snow we are not sure that the arrangement was satisfactory.

The greatest difficulty we had with pontoons was in trying to take off from high rough seas. We made four attempts with our Lockheed seaplanes to rise from seas more than three feet high and might have managed had it not been for a nasty cross swell. As it was, and due to the skillful piloting by Al Cheesman no greater damage than strained stanchions and struts resulted. We did, however, make eight flights from beside our vessel when she was more than 100 miles from land and over water 1,500 fathoms deep. Some of these take offs were made from water which was whipped into white crested waves by the wind. Other seaplane flights were made from channel and harbor waters.

It might be thought that seaplane flying in the Antarctic would be difficult or impossible because of the temperature, but only once this summer, when about 1,100 miles from the South Pole, did we experience difficulty with ice forming on the pontoons. This more than anything else might draw attention to the fact that the summer temperatures in the antarctic, even though surrounded by ice floes and ice bergs, is not so very low. Ten degrees below freezing was the lowest temperatures registered between November and February in the areas we visited. In the Arctic we flew in late winter and early spring in temperatures 86 deg. F. below freezing and suffered no harm or inconvenience. This speaks volumes for our equipment, the Wright Whirlwind and the Lockheed Vega. In this plane we carried out tests in 110 deg. F. in the shade in California, flew across the Arctic in fifty-four below zero weather, shipped it uncovered across the Atlantic, flew it throughout the length and breadth of the United States, shipped it through the tropics to the Antarctic. Used it throughout an Antarctic summer during which time it fell through the ice and became saturated with sea water. It was rescued, dried out, flown and then stored—the fuselage and engine—in the open throughout an Antarctic winter. (The wings of our two machines were removed and housed.)

This summer we reassembled the machine, flew it for more than 3,000 miles over the Antarctic pack ice and mountains, shipped it to near Uruguay, then put it over the side of the vessel, flew it to Montevideo and on to Buenos Aires, where in good order and condition it was sold to the Government Civil Aviation Department of the Argentine. No severer test need be carried out in order to prove the serviceability and handiness of this type of plane. This does not mean that I champion all-wood construction exclusively, but for our purpose it was ideal. The high wing, light, full cantilever monoplane was of special advantage to us particularly when we had to transport it, set up ready to fly, on small steamers in rough seas and when it was necessary to frequently change the landing gear. On the shores of the Antarctic there were no conveniences or overhead tackle for hoisting the plane so when on the beach a device made of wood in the shape of a high lifting jack—one under each wing—was used for raising the machine and changing the wheeled and pontoon gear.

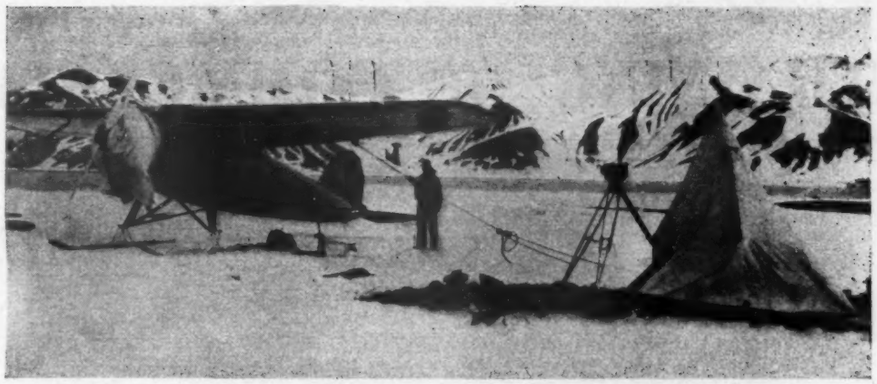
This year our landing gear was fitted with Goodyear airwheels. We found them particularly advantageous on the landing field at Deception Island. During the season the field went through a variety of changes, from being covered in parts with two feet of snow, in others rough, frozen lava, to a condition of soft wet snow and water-soaked gravel. It would have been impossible to have carried out test flights with ordinary wheels. The large sized tire wheels solved that problem.

ONE OF THE PROBLEMS we faced was the transport of the machines and supplies from the base to the flying field. This was overcome with the use of a light Cletrac Tractor, the lightest we could find. But the comparatively slow moving tractor could not satisfy all requirements, so we provided a small Baby Austin motor car. By chaining an extra wheel to each wheel on the car, using eight wheels in all, we found that the car would cross almost any kind of surface we met and that standard model automobile, the first ever to be used in the Antarctic, proved to be extremely serviceable.

All these mechanical arrangements were provided to get us into the air but the greatest problem, in polar flying, apart from successful piloting, is that of navigation. For that purpose the American Geographical Society produced a special map of stereographic projection and perfected a simple line-of-flight method of determining position lines. This method depended of course on solar observations both with regard to the altitude and azimuth of the sun. It is a method particularly suited to high latitude navigation in the summer when the sun is above the horizon all day or rather for two or three months without setting. Anyone interested can obtain such maps and instructions from the American Geographical Society's School of Surveying, New York.

I used, in connection with that method, a war-time Royal Air Force Bubble sextant. I will not describe it because there are now available much more simple, lighter and equally suitable sextants manufactured in this country. I found it not difficult to get from the cabin of our plane sufficiently accurate sights of the sun to fix our position with comparative accuracy. When possible, however, I timed the flights to start at such a time that the sun would be visible from a position behind the wing and from where the navigator's compartment was located. All airplane navigation used so far for exploration has depended on certain aids from ground observation. The speed and drift indicator I used was

also a war-time instrument made by Hughes and Son of London and one on which the ground speed of the plane and the wind direction and velocity were graphically described. My experience has been that it is easier to draw graphs which remain to be consulted at some later time than to calculate by slide rule. But as there are now more modern and more efficient drift indicators available I will not describe in detail the one I used.



The Lockheed Vega set up on skis. This plane was used by Captain Wilkins and the late Lieut. Carl Eielson

For maintaining direction we used four types of compasses. The pilot was provided with the usual airplane instrument-board type and a Hugheson aperiodic. I used an observer's type aperiodic to which is fitted a pelorous for convenience in taking bearings of the sun and geographical points of interest, and an extremely sensitive compass of the large, pocket type. By keeping constant check of the swing of the sensitive instrument and a regular check on the aperiodic and recording the reading of each at every swing and noting the elapsed time between each swing, I could readily plot on the map the actual course of the machine—not forgetting to apply, of course, the observations made of the ground speed and drift. The keeping of this more or less constant record required much time and mental application, but after considerable experience it becomes more or less automatic and leaves time for taking photographs and for observation of the meteorological and surface conditions.

ALL THESE CALCULATIONS and observances must be taken into consideration when deciding as to the altitude at which to fly and my experience has proved that successful aerial navigation depends not only on horizontal direction but vertical as well.

Much time can be saved by taking advantage of the favorable airstreams and after considerable study one becomes efficient in judging from afar the conditions of the atmosphere. Considering everything, an aerial navigator when traversing new and virgin fields is kept busy every moment of the flight. Without such carefully kept records it would have been impossible for us to have located Spitzbergen exactly after a 2,500-mile flight —2,200 miles from coast to coast, or to have found our way this year out 400 miles and back to the "William Scoresby," a vessel only 150 ft. in length and with masts less than 30 ft. high. From 400 miles away, after flying out through many snow storms, the vessel seemed to us even less than a speck on the ocean. Most of our trips this year were made over monotonous ice surfaces and through frequent snowsqualls without even a sight of the sun and when "dead reckoning" only could be used. Our method of surveying, in a reconnaisance way, the new lands discovered was by time and distance, dead reckoning and photographs, and by direct bearings taken of known and fixed geographical positions.

But all the tricks and knowledge of navigation would have availed us nothing were it not for the skillful piloting of the plane and the competent co-operation between pilot and navigator. In this respect our expeditions have been extremely fortunate. The late Carl Ben Eielson was an ideal pilot and companion in this respect, and scarcely less so were the two pilots Al Cheesman and Parker Cramer who accompanied me this year. Of course the serviceability of our machines depended on the man in charge of the power plant and in Orval Porter we had a most efficient and reliable engineer. In the last three years we have not had one forced landing and very little delay because of the engines. The only serious inconvenience experienced was because of frequent condensation in the gas tanks and fuel lines. Before each flight it was necessary to be sure that each tank was free from water and several times it was necessary for us to remove the whole fuel line system and heat the pipes to free them from ice which had collected between flights.

Wireless direction finding is not yet possible on pioneering flights of exploration or at least not for long flights from a land base. It has been used successfully for flights up to 150 miles from a base ship. Our Heintz and Kaufman short-wave airplane sets kept us in constant touch with our base while we were in the air. During our Antarctic flights we carried two wireless sets—one 50-watt wind-driven set for use in flight and a ¼-hp. gasoline plant for use with the airplane transmitter if forced to land. We had a fifteen-watt hand-driven set in case we had to abandon the plane and walk home.

For the extreme emergency we carried with us in the plane food and equipment totaling for each man 120 lb. in weight. There was enough food to tide us over a period of two months and clothing and other equipment for two years at least. It would, of course, always be possible anywhere in the Arctic and along the coasts of the Antarctic to get sufficient food to maintain oneself indefinitely, provided that one knows the method of hunting and securing food in those regions.

The details of clothing and other equipment depends on the type of man who will use it and the conditions over which he will fly. We are thankful to record the fact that in the Antarctic at least we did not need to use our pemmican, biscuit chocolate and nuts in any emergency, and fortunately we carried out the essential part of our program without serious misfortune or adventure.

Our program, briefly, was to locate suitable points from which useful meteorological data might be economically collected and to decide upon the most economic means of communication with them. One of those points must necessarily be south of the Pacific Ocean. That and other points have been determined and while doing so we were able to carry out the geographical work outlined earlier in this article.

TRAINING OF COMMERCIAL PILOTS IN *Germany*

A primary training type taking off. A Heinkle HD24 seaplane

An Interview With
HERR HERMANN BECKER
Director of the Deutsche Verkehrsfliegerschule
By
RICHARD M. MOCK
In charge of Design and Construction at the Ernst Heinkel Flugzeugwerke

AS IS well known, Germany has no military aviation and, for that reason, much of the money and effort that would normally be spent for the training and education of military and naval pilots can be diverted to the development of men for commercial work.

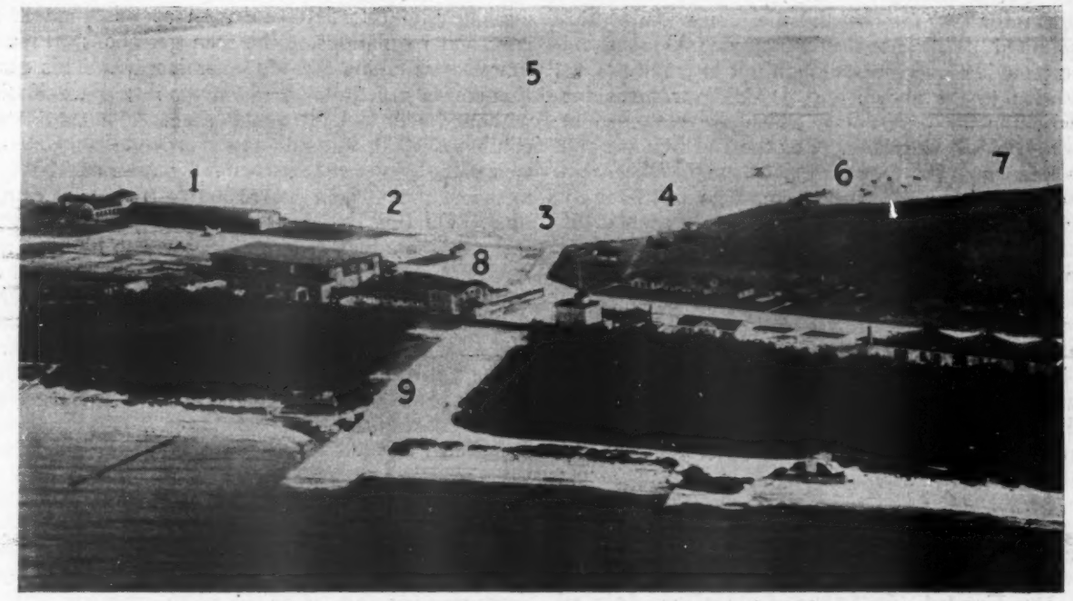
The work of training these pilots is entrusted to the Deutsche Verkehrsfliegerschule, usually called the "D.V.S." for short. This organization, which has been in existence some four years, works in close cooperation with the operating companies employing its graduates. Principal among these is the German Luft Hansa, though many of the men find positions in other companies and abroad.

As German aviation is assisted by the government in the form of a subsidy, there is a goodly number of applicants each year to take these training courses. Therefore there must be considerable weeding out in order to select the best men for the complete course.

The flying course given by the "D.V.S." for full transport license are divided into two groups, one for land pilots and the other for seaplane pilots. The land course is three years, full time, while the sea course is four. The first year and a half the two courses are identical and in that time fundamentals in land planes, seaplanes and flying boats is given. All through the entire course of study a great deal of time for both land and water pilots, is devoted to navigation and radio, so that when the men finish they not only have the highest commercial pilots' license but also the qualifications of a second-class marine navigator and radio operator second class.

Though it cannot be said that the school is run on a military basis, there is considerable discipline. All men are residents at the school and though they are given considerable freedom and frequent leaves in the complete course of instruction, many of the students spend much time "confined to the boundaries of the flying field" or "confined to quarters." As in the States, flying time is one of the major prerequisites for advanced license the strictest disciplinary measure is to ground a man ("startverbot") from one to thirty days. A man is often

For those who are of the opinion that requirements for flying licenses in this country are too strict we call particular attention to this article which deals with the operation of the German school known as the Deutsche Verkehrsfliegerschule, or "D.V.S." for short. In this country flying instruction is regarded in terms of months whereas in Germany it is regarded in terms of years. ¶One particular point of interest that Mr. Mock brings out is that out of almost a thousand applicants only an average of twenty-five are finally accepted for instruction. Student tuition is another of the many interesting items that are well worth the consideration of those now struggling with flying school problems.



The D.V.S. school and Heinkle plant photographed from over the Baltic. 1, seaplane hangar; 2, Heinkle factory; 3, airport police; 4, D.V.S.; 5, Breitling; 6, D.V.S. messhall; 7, landplane hangar; 8 and 9, concrete runways

requested to leave the school after he has been grounded a second time.

Naturally, since the finances of the school are quite limited, there must be a great deal of selection in reviewing the applicants to insure that only the most promising students are retained. Though the school is subsidized, each student must also undergo considerable expense and for that reason only the financially able can complete the course. The financing of the school may be compared to that of an endowed university operating under high expenses and endeavoring to have its students chosen from the best of the country's young men. In German opinion, it is not possible for a private owner to run a flying school on an economic basis without subsidy, and give a thorough aeronautical education. The German schools operate under a high expense using large transport machines of high power, similar to the planes the men will later fly with in traffic.

After they enter the school all students are on the same financial basis. Each student must pay his own living expenses at the school. This amounts to 165 marks a month (actually this is about $40.00, though the purchasing power is close to $80.00). From this the student gets 25 marks for spending money, with the rest for board, room, clothes, books, etc. This is quite expensive for the average German young man who is not able to earn anything for so long a period. If a student is a very promising pilot he can borrow money from the school and pay it back later at the rate of 10 per cent when he has secured a position as a pilot. Each student must pay 5,000 marks ($1,200) for flying instruction for his first license, called "A" for land machines. The financial subsidy of the school comes from the budget of the Ministry for Transportation and covers the instruction for higher licenses.

All courses at the "D.V.S." are directed toward the obtaining of pilot's licenses of either "A," "B," or "C" grade. "A" license is for machines up to 2,600 lb. gross weight and is limited to private flying. License "B" is for airplanes up to 5,500 lb. gross weight and might be said to correspond in some ways to the American Limited Commercial License except that the pilot may fly passengers in traffic with machines of this weight. The "C" license is for planes over 5,500 lb. gross weight and can be compared with the American Transport License since it is the highest license and it allows one to fly passengers in traffic with heavy airplanes. In addition, there are intermediate or limited licenses for each class to permit a student of one class to take training in planes of the next higher class.

Headquarters of the "D.V.S." are in Braunschweig, in west Germany. Here some 700 to 1,000 applications for flying instruction are received each year. To each of the applicants papers are sent outlining the courses and stating the prerequisites for entering. There are three main categories of entrance requirements. Under the first category (candidates for transport "C" license), the student must be a high school graduate and have the same credentials as required for entrance in a university. He must also have a speaking knowledge of English, though now Spanish is being accepted as an alternative. It is believed that the great airlines of the future will go to English and probably Spanish speaking countries.

The secondary category includes men witih chiefly a mechanical education. They must first go to the "D.V.S." mechanics school and then pass a special examination at Braunschweig. This examination is somewhat easier than that equivalent to the first requirement under category one. Though it is considered an advantage to know English or Spanish, a language is not required. These men are only eligible for "B" license and therefore their flying training takes only two years. These men receive free room and board and in addition 12 marks a week. To continue with schooling most men under category two must borrow money which they return after they have completed their instruction and are working.

The last category is made up of a group which includes aircraft engineers, motor engineers, and lawyers specializing in aeronautics. They take a one-year course to

quality them for "A" license and the intermediate "B." For this limited "B" license they must fly 3,000 miles and may then pilot "B" machines though not in traffic.

In addition to the above, the "D.V.S." prepares for "B" license the air port police which are stationed at every flying field in Germany. For the Luft Hansa and other traffic companies, they also train for "B" license a number of radio men, mechanics, etc., who will later fly in traffic in these capacities. Besides these a number of ground mechanics and radio men are also given instruction.

Physically all students must pass an athletic examination before presenting themselves at the school. Athletic examinations are standardized over all Germany and are divided into three classes, bronze, silver and gold. The first, that for the bronze metal, is the most difficult and is required for all students up to 30 years old. Above 30 they may take the examination for the silver medal and above fifty the gold. The age range for flying students is 18 to 26.

IF THEY successfully pass all of the above, the candidates go to Berlin to take another physical examination under a Dr. Koschel, a pilot, who alone examines all students. About 15 per cent of the applicants do not pass this physical examination. Then the men are subjected to a psychological examination to determine their adaptness to become an airplane pilot; this again eliminates about 10 per cent more of the applicants.

From the 700 to 1,000 applications each year for category one some 100 are chosen to present themselves at Braunschweig for an interview. After the interviews and physical examinations some 70 to 80 students go to the school at Braunschweig in the middle of March to begin the course. During this time the school authorities are given a better opportunity to become acquainted with the men. The first four weeks are devoted chiefly to athletics and some work around the planes. The men are each taken up for a few flights by two of the most experienced instructors who must report on the reactions of every student. After about four weeks most of the students are sent away and only about 25 remain to continue the course.

In the middle of April these 25 go to Neustadt in Holstein on the Sea. This is near Lübeck, on the Baltic. They remain there for about six months undergoing intense physical training, living on the water nearly all the time and at the same time studying the fundamentals of radio and navigation. They do not fly, but spend most of their time on the water in small boats and later make two or three long trips of some weeks in large schooners. They visit Sweden, Norway, Denmark, Danzing and Finland. All of this time they live quite the same as sailors. Toward the end of September they take their examinations and though, most usually pass, occasionally one or two drop out. This examination is about the same as for coastwise maritime pilots.

In the beginning of October the men go back to Braunschweig and begin their first flight training. They remain their about six months during which they spend some three months in the shops and three more months in receiving instruction on land machines. This prepares them for "A" license which corresponds to our private license. At the same time the students receive a theoretical ground course under the direction of a special engineering instructor in addition to their other teachers. This includes airplane theory, engine theory, meteorology navigation with instruments (map reading, dead reckoning, etc., no celestial navigation at this time) and air laws and regulations. The men get about 30 hr. flying time before taking the "A" examination. This examination consists of three spot landings in a space 50x250 yd. without rolling outside of this area. The candidate must climb to 6,000 ft. and stay there one hour and must also make two small cross-country trips of 100 km. (63 mi.) and then a final cross-country trip of 300 km. (190 mi.). On this last cross-country trip the student must make two landings at fields unknown to him but marked on a map given to him just before he starts. An official is at each field to certify the landing. It is required to make a dead stick landing from 3,000 ft. over the field and land on the field without using the throttle. The student must also fly over the field at 1,500 ft. and when a Very pistol is shot from the ground he must close the throttle and make a spot landing in the same area as mentioned above. This instruction is given chiefly to prepare the student in case of engine failure. This primary training is made with Flamingo biplane, powered with Siemens engine.

About the first of April, after some 13 months of training, the students begin on a 5,000-km. (3,100-mi.) cross-country solo flight to acquaint them with all of Germany. As the country is not very large, this usually means visiting many places twice. It gives each man about 50 hr. flying time and takes about two months. The entire cross-country trip is planned to include all kinds of weather and flying conditions.

Toward the end of May or the beginning of June the group goes to Warnemünde for seaplane training under the direction of Mr. Becker. Warnemünde is located on the Baltic and is fortunate in having a good sized inland lake separated from the sea by a strip of land on which is the flying school, the flying field and the factory of the Ernst Heinkel Flugzeugwerke. Warnemünde is the only German seaplane base with a concrete runway to the open sea enabling its pilots to fly in the winter time, when the inland lake is frozen. The Heinkel works supply many of the seaplanes for the use of the school.

THE FIRST seaplane training is in Heinkel HD 24 twin float biplanes powered with B.M.W. IV—230-hp. engines. After about 20 flights with an instructor the student makes about 30 solo flights before trying for an "A" license as a seaplane pilot. To get this license one must first make three spot landings on the water in an area outlined by five buoys laying in the direction of the wind and covering about 250 yd. The student must fly over the buoys at 1,500 ft. and cut his gas and land along side the buoys not more than 50 yd. away. The plane has a normal landing speed of 44 m.p.h. and the student is allowed six tries, three of which must be in this area. He must then make three landings in the open sea in a sea between "two and three." This corresponds to a wind velocity of about 18 m.p.h. Each time the student must stop his engine, drop a sea anchor, start the engine again and take off. To complete the requirements for his "A" license requirements he must also make a 100-km. oversea flight with two landings at specified places. In all, the student must have about 100 flights or 15 hr. flying time in seaplanes for this license which might be compared to the private license for landplanes.

After the students have completed the requirements for the "A" license, about seven or eight of the best seamen are selected to become seaplane pilots while the others return to Braunschweig for a corresponding course with land machines. The two courses are quite similar

but, as the seaplane course requires a more varied study, the latter will be described.

Those men, who are selected to remain in Warnemünde continue with the same Heinkel HD 24 machines preparing for their "B" license. It seems that in taking the various flying examinations in Germany the pilot undergoes a certain amount of very useful training. For an intermediate "B" license a pilot must make three landings in bad weather and then in a sea of at least "three to four," corresponding to a wind of about 22 m.p.h. He must also maneuver the plane when towed by a steamer in this same heavy sea. To complete the requirements he must make an oversea flight of 300 miles landing at two specified places and returning to his base within eight hours of the start. The student then obtains a limited "B" license which enables him to begin a series of overseas flights in "B" machines which last the rest of the summer. These trips take them all over the Baltic; to ports in Norway, Denmark, Sweden, Danzig and, naturally, numerous places on the northern coast of Germany. During the summer, the students fly whenever the weather is good and on bad days continue with their ground training in radio, navigation (not celestial) and aviation engines. Later the student must make two night landings in a restricted area marked off by lighted buoys and in addition he must fly one hour at night.

EARLY IN OCTOBER the men leave Wernemünde for a winter cruise on the German merchant marine training ship "Deutschland." There are usually about 200 merchant marine cadets on board and with these are about seven men from the "D.V.S." It seems that pilots do not like this cruise as they are treated like sailors the same as are the normal cadets. This cruise, for the last few years, has been going to South America returning in February when the students are allowed their first extended leave of absence in two years. This leave is usually about four weeks after which the men go to List on the Isle of Sylt in the North Sea. They stay there for the summer to take advanced training on Heinkel HE 5 twin float, low wing seaplanes with B.M.W. 550-hp. engines. During this summer they cover some 6,000 miles in the North Sea where navigation and seamanship is more difficult than in the Baltic. They make trips to the Dutch Islands, England and Norway, and at the same time receive instruction in navigation and radio for long flights. At the end of the summer they must pass an examination in partial blind flying. From List many of the men go to the Luft Hansa as second pilots where they fly for about four to six weeks covering some 6,000 mi. in traffic.

At the end of the summer the seaplane students return to Warnemünde for special courses in radio, meteorology, engine theory, airplane theory and navigation preparing them for the theoretical portion of the examination for the final "B" license. During this time the students fly only about two afternoons a week with no cross-country work. In addition to the course in theoretical navigation the students must navigate one of the 60-ft. boats of the school between two specified points in thick weather. Later they each make six round trips on the steamers going from Warnemünde to Denmark. The students first make the trip in daylight steering the boat under the supervision of one of the school instructors who accompanies them. Later they make trips at night navigating by celestial observations or in thick weather with the radio direction finder. The boats are fitted with a mechanical recording steering mechanism which shows quite well the course taken by the students. The purpose of these trips is to first let the student navigate on board ship where it is not as difficult as in flight. After the students get more advanced they make oversea flights in the Meinkel HE 9 and Heinkel HE 10 twin float low wing sea planes which are advanced machines fitted with radio directional finders, etc. These are fast planes powered with B.M.W. VI 600-hp. engines.

Toward the end of the winter, the students complete their theoretical course and have more flying time for their final "B" license. However, first they must pass an examination in navigation similar to that given for a seaman's license except that there are additional parts pertaining to flying. They must also pass a second-class radio examination given by the Radio Ministry Department. This calls for some 80 letters per minute in closed text and 100 in open text. In addition they have examinations in aerodynamics, engines and meteorology.

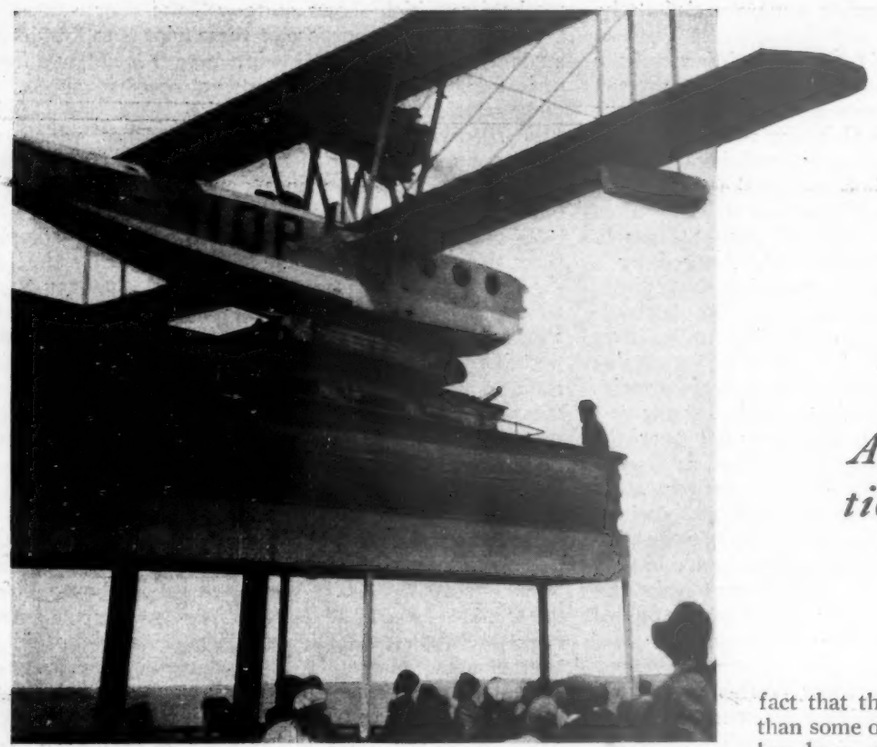
AFTER COMPLETING these examinations, the student returns to List to prepare for a "C" license. Here, he gets flying time with Dornier flying boats and Heinkel and Junkers seaplanes. The men must get in about 6,000 to 9,000 mi. of oversea flying, and consequently make many trips to Sweden and Norway. Those men who did not get enough flying time the previous summer go as second pilots to the Luft Hansa and occasionally the students make long trips over the North Sea in Dornier Wals or Super Wals or three-engined Junkers G 24 machines on floats. On these flights the student makes his celestial observations and operates the radio apparatus alone but usually carries an instructor as passenger. Last year Director Von Gronau of the "D.V.S." took three students with him in a Dornier Wal on a trip to the Faroer, a Danish island north of England and from there they flew to Iceland.

Sometimes, during this last summer most of the students begin looking for positions and if they obtain a position before the end of the summer they are allowed to leave the school and fly "B" machines in traffic until they have a total of 6,000 cross-country miles that is required for the final "C" license. After this, the students return to Warnemünde for the last winter during which they take additional theoretical courses that are required for "C" license. After they have completed these courses and have made three landings with one of the large multi-engined planes they receive their "C" license and usually go as land pilots for the Luft Hansa to get time overland for a year or two before carrying passengers over sea. Of course many of the men go directly into the services of other companies, such as the Scadta in South America, and thus fly seaplanes in traffic at once.

It is interesting to note the losses incurred during flying instruction. There have been no fatal losses on seaplanes since 1925. The only fatal accident was when a student was struck by a propeller. Each year there have been a few minor accidents on the ground and those due to forced landings and sometimes bad landings. It has been stated that plane losses are more expensive with seaplanes than land machines, because of the fact that a bad landing often means total submersion and thus sometimes causes the plane to be a total loss. There is about one total seaplane loss in every 600 flying hours and one landplane loss in every 2,000 hours. However, the percentage of small and minor accidents is much more with land machines.

Ship TO AIR

An Account of Early tion by the French



The Llore et Olivier on the fixed catapult track on the Ile de France.

By CHARLES H. GALE
Assistant Editor of AVIATION

EARLY in the morning of its last day at sea on every voyage, the steamship Bremen, of the North German Lloyd Line releases from its sun deck, a stout little seaplane, loaded with mail. This machine speeds ahead of the steamship, and lands in the harbor hours before the Bremen itself arrives. This ship-to-shore service, during certain months of the year, operates as a regular integral part of the world transportation system.

Although this ship-to-shore system is not a new idea, it remained for two European steamship lines to actually adopt it. The French Line made a bow with its experimental operations in the summer of 1928, and both the French Line and the North German Lloyd put it on an established basis, quite free from the aspects of an experiment, during the summer and fall of 1929. The latter resumed service in April this year while the French Line has not announced its plans. Additional credit goes to the North German Lloyd since it caused the catapulting equipment to be built into its newest steamships, the *Bremen* and the *Europa*, as a standard item of construction. This meant that the airplane had definitely penetrated the marine world, and also that the steamship interests were anxious to keep abreast of the modern trends, and profit by the particular advantages offered by aircraft.

Practical ship-to-shore flying has been possible through the use of the catapult, a device long employed in naval aeronautics. The catapult scheme owes its favor, as far as commercial operations are concerned, to the fact that the cost involved is much less than some other methods would be. Risk has been greatly reduced through the policy of using seaplanes or flying boats and by concentration on mail cargoes alone. The safety factor is increased by virtue of the vast amount of experience accumulated through years of naval catapulting. In fact, naval types of planes are those being used in the present commercial service, and naval-trained pilots are their operators.

Both the French Line and the North German Lloyd report complete satisfaction with this catapult method. So satisfactory have their experiences been, that future plans for construction of major vessels for both lines include careful provision for ship-to-shore services by means of the catapult. This applies also to the United States Line, and others are known to be watching the operations carefully with the intention of adopting the idea when they themselves become fully sold on the project. Just as none of the larger naval vessels are complete without airplane and catapult equipment, so it appears that before long no modern commercial steamship of major rank will be without its aeronautical installation.

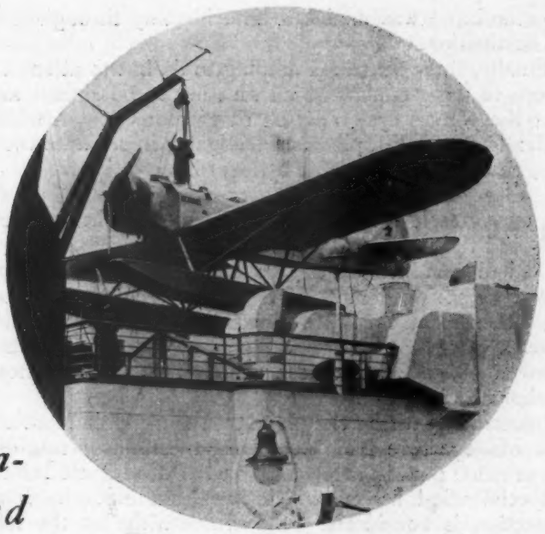
LIKE the air transport operators in this country, the steamship lines are preferring to concentrate on mails and freight in the early stages. They anticipate that it will be some time before ship-to-shore accommodations are provided for passengers, although they are interested in the passenger angle. Suitable aircraft and handling methods must be developed first of all.

Owing to the fact that the catapulting method is not new, the main cause for the operation of the ship-to-shore service seems to lie in the development of a sufficient demand for such a service. If there had been, in other words, a clamor for the service five or six years ago, catapults probably would have been installed without much hesitancy on the part of the ship owners. While

Shore

MAIL SERVICE

Experiments and Present Day Opera-Line and the North German Lloyd



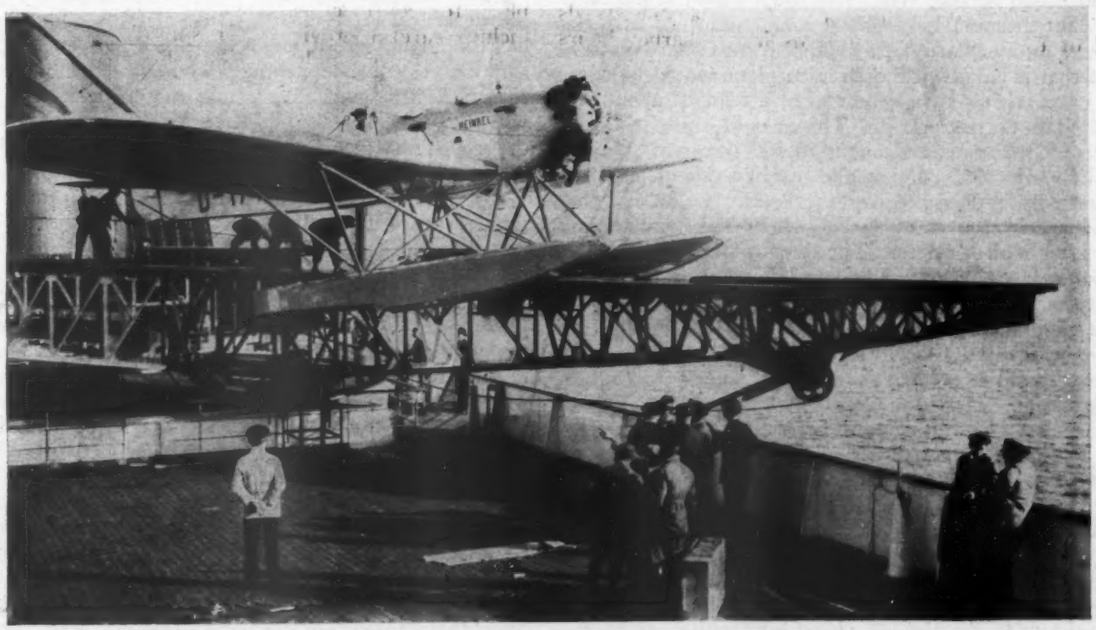
The Bremen's planes being hoisted aboard after completion of a mail flight.

the obvious time-saving advantages have long been generally acknowledge, the sufficiently extensive demand for such a service has rather tardily followed the spectacular development of the air mail habit on overland airlines.

Since this amounts to merely using an old method for a new purpose, what lessons the two companies have learned include for the most part only general points such as the necessity of modern equipment throughout, faster planes, increased cruising range, ample cargo capacity, more frequent schedules, reliable weather reporting service, efficient radio communication between planes and control stations, and installation of the catapults at the time of the construction of the steamship, so that every detail may be adequately provided for, rather than having to put up with an installation added as an afterthought.

However, one notable improvement to be incorporated in the plane designed for the Europa was dictated by experience with the Bremen's plane. The latter was arranged with seats in tandem but the new machine is to have seats placed side-by-side to facilitate communication between the pilot and his mechanic-radio operator during periods of intense navigation and for radio communication.

Such an arrangement was suggested last year at the time the Bremen's mail plane attempted to fly into Boston in an effort to accommodate Boston interests seeking to test the feasibility of making that harbor a regular port of call for the plane. Pilot Jobst von Studnitz met fog



The Bremen's mail plane poised on the catapult on the sun deck, in position for a launching.

near land and was unable to find his way through it to his destination.

Finally, there remained nothing to do but to attempt a return to the Bremen, which sent out radio signals and kept the plane's crew advised of the direction in which it should fly. With pilot and navigator in separate cockpits, navigation was rather awkward.

A FEW CHANGES have been made this year in the plane and the method of handling it on the ship. Larger tanks had been installed to give the plane a range of about 8 hr. flying instead of but 6 hr. This permits taking off from the steamship much further from land than previously. It is expected the plane may be launched between 400–600 mi. at sea during this season instead of about 300 mi. out.

Instead of parking the plane on the catapult from the time of departure from port until the time of take-off, the practice now is to place it on the deck itself behind a special wind screen which has been erected. This protection is considered quite worth-while as the machine was subjected to some real strains while poised on the catapult in the face of the ocean winds. A bridge-like track has been built by which the plane may be transferred from the deck to the catapult and vice versa.

This year the operation of the Bremen ship-to-shore service is under the Luft Hansa. This means that the well-known German air transport company has direct charge of operations by arrangement with the steamship people. Last year the North German Lloyd borrowed the plane and crew and handled the operations itself. The present method is declared to be superior.

As in any form of transportation, the value of the ship-to-shore service will increase with its frequency. Either the Bremen or the Europa leaves port on either side of the Atlantic about every week. As soon as the Europa is equipped with its catapult (some time in July) there will be available a weekly ship-to-shore service by that one company. Thus mail matter placed on board one of the ships for departure on a Monday midnight would reach Germany on a Friday or Saturday. Mail placed on board one of the ships at Bremen at midnight of a Monday for the westbound trip would reach New York City the next Saturday.

Operation costs are not available from either company except that it is known the Bremen plane would be operating on a paying basis if carrying a load of about 250 lb. of mail on each trip. This would mean a gross income from the mail of about $1,300 per trip. On the first trip of 1930, the plane carried about 100 lb. Undoubtedly it does not pay for itself yet, but is being carried on in the same spirit which has actuated all pioneer air mail services. The items of expense include the salaries of pilot, radio and navigating assistant, mechanics, and cost of repairs and fuel for the flights. These flights occur only a few times each month, of course. Both the German and French companies have asserted that the service is worth-while.

The mail is carried under contract with the French and German governments. The United States government has no contract directly with the steamship companies but has an agreement with each of the governments involved. The Postal Administration of Germany is paid 50 gold francs (about $11.50) per kilogram (about 2.42 lb.) gross weight. This payment includes onward forwarding of the mail matter by connecting German airlines.

Payments to the French postal authorities are as follows: (1) Letters and post cards; up to 10 g. (about 0.35 oz.) 10 French francs (about $3.90). For each 0.17 oz. above the first 0.35 oz., $0.19. (2) Other articles, per 1.75 oz., $0.19. These rates do not include onward forwarding by French airlines.

The fee to the public in this country for the use of the Ile de France ship-to-shore service last year was as follows: $0.60 for each half ounce or fraction in the case of letters and post cards and $0.25 for each 2 oz. or fraction thereof in the case of other articles. This air mail fee is in addition to regular postage. For the Bremen service, there is a charge of $0.20 for each letter not exceeding ½ oz., $0.35 for each letter exceeding ½ oz. up to 1 oz., and so on in progression ($0.15 being added as an air mail fee for each additional ½ oz. and $0.03 being added as postage fee for each additional ounce). The total charge for a post card is $0.18 ($0.15 air mail fee plus $0.03 regular postage). Such air mail will be forwarded by air in Germany.

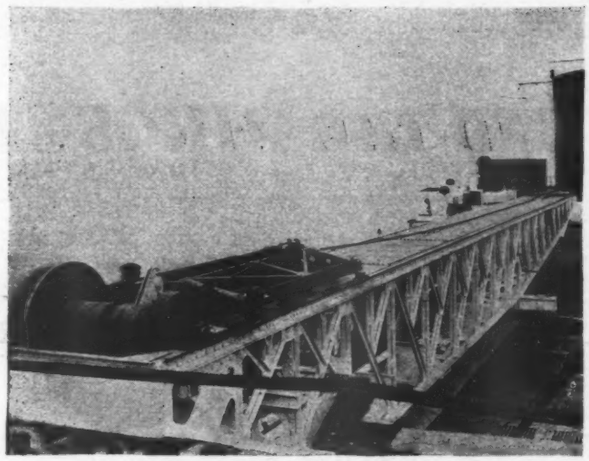
The French Line in 1928 undertook the first serious ship-to-shore service on a regular, scheduled basis. A Liore et Olivier flying boat was used with Leo Domergue as pilot. The catapult was the St. Nazaire type—a fixed track built into the deck and dependent entirely on the direction of the steamship for launching direction. Several launchings were made on both sides of the Atlantic and the company expressed satisfaction with the system. On one of the eastbound trips, however, the plane was forced to land at sea because of engine trouble. The lateness of the season and the desire for additional technical study of the service caused the company to abandon the service for that year.

The first to get under way last year was the Bremen service. This ship may be considered to have ushered in the permanent use of this method since it was built with such a service definitely in mind. The catapult became standard equipment and the latest and most practicable type for that particular ship was installed. Thus the catapult became less of an experiment added as an after thought and assumed the aspect of a device to be definitely reckoned with.

THE SEAPLANE and catapult used are Heinkel products, described in AVIATION, Aug. 8, 1929. This catapult has the advantage of not being dependent on the steamship direction for launching. The track is mounted on a turntable which may be swung to the desired direction without changing the ship's course to any appreciable degree. Thus the Bremen may steam at practically undisturbed speed while the launching operation occurs. The Ile de France, on the other hand, is forced by the fixed type of track to make a serious business of the launching process, involving change in direction and speed.

The usual thing last year was to launch the Bremen plane about 300 mi. east of New York, on the westbound trip. The time of launching and distance from the shore depend upon the position of the steamship, the amount of time before nightful and the weather. Since it is a seaplane without the resistance of a flying boat hull, it has the rather high cruising speed of between 110 and 115 m.p.h., enabling the plane to reach New York harbor in a comparatively short time. This represents an average of about a half day's steaming of the Bremen.

In the light of the experience of the plane crew last season, it is expected Boston will not be used as the American terminal. Fog is much more prevalent in that area than around New York Harbor. Theoretically.



The catapult track on the Bremen. Note the carriage on which the plane rests, just forward of the cable drum.

Boston would be a desirable port for the plane since the mail could be landed hours earlier than under the most favorable conditions with New York as the destination.

As further examples of the interest which the North German Lloyd Company is taking in this ship-to-shore service, it should be mentioned that its steamers have landed mail at Galway, Ireland, to be flown to London and thence to Germany. This seems to have been quite satisfactory. Then there is the experiment with the Kiwull attachment, whereby the seaplane may be landed in the wake of a steamship, and taxied to a canvas landing stage trailed at the steamer's stern. This has been devised to permit contacts between steamship and planes, without making it necessary for the former to slow down. The plane is taxied to the landing stage and maneuvered upon it by a landing party on the ship. Mail may be transferred to and from the plane, which is then cast loose and after dropping behind, takes off. It is understood that this may be installed in some of the slower ships owned by the company, such as those used in the South American trade. The device has been found impracticable for the faster vessels.

Not long after the Bremen began operations, in 1929, the French Line resumed its plane service. A C.A.M.S. flying boat was used on the Ile de France that year, and was reported to have given better satisfaction than the Liore et Olivier. It was operated by the Compagnie Transatlantique Aerienne, a subsidiary of the French Line, functioning as a separate unit. The Ile de France is the only one of the line equipped with a catapult and none of the present fleet will be so equipped because of the large amount of revamping which would be necessary. However, like the North German Lloyd, the French Line has great faith in the service, and its new large boats will incorporate catapults as permanent features. Both companies agree that the installation of catapults should be made during the construction of the steamship.

The C.A.M.S. was powered with a Lorraine Dietrich 250-hp. water-cooled engine. The engine bed and wings were reinforced to withstand the shock of catapulting. Two persons were carried, M. Domergue the pilot, and Laurent Cailorbotte, the radio operator and navigator. The machine is of biplane construction, and its wings folds so that it can be stored on the steamship without taking up much room. The plane has a capacity of about 220 lb. of mail, but only between 45 and 55 lb. were carried on each trip. The company hopes to have a larger and faster plane available this year, if and when service is resumed. The catapult is about 64 ft. long. Two mechanics stationed on the steamship look after the plane and there is, in addition, a manager of the ship-to-shore service, who travels with the vessel on each trip.

Boston has been looked upon with considerable favor by the French Line as an American terminal, and it has been tried out several times. The plane is usually launched about 100 mi. from shore, although on occasion it has been launched about 350 mi. out. On the European side the plane is landed in the Seine at a point about 3 mi. from the Paris Post Office. The French postal authorities meet the plane and rush the mail to the post office for sorting. A regular shore-to-ship service, the reverse of the present procedure has not as yet been attempted by either line.

One of the fundamental conditions of successful operation of the ship-to-shore service on both the Bremen and the Isle de France is adequate weather reporting. The custom is to notify the weather bureau at either terminal of the probable time of launching the plane and the following day, before the plane takes off, the shore weather bureau gives a report of the conditions to be expected over the course flown. This service has been of great assistance. Radio equipment is carried by each plane.

Some interesting experiments in this ship-to-shore scheme have been carried out by other steamship companies, notably the United States Lines. No aeronautical activity is being carried on by this line at the present time, in spite of its various experiments, but its officials have stated repeatedly their belief in the value of co-ordinating air transportation with steamship travel, and it is expected that the line will carry on extensive aeronautical activities in the future.

AMONG the things which this line has sponsored was the flight Clarence Chamberlin made from the Leviathan on Aug. 1, 1927, from a specially prepared platform. As a result of this experiment, Mr. Chamberlin recommended that a catapult installation would be more practicable. Early in 1929 the company experimented with the Adams Air Mail Pickup Device, again on board the Leviathan. Several successful transfers of mail were made with this, but it has not been adopted for regular use.

In May, 1928, the Army blimp TC-5 contacted with the steamship American Trader of the United States Lines. A representative of the company was transferred from the steamer to the blimp, and was flown to Lakehurst. This, the company claims, is the first time an airship was ever known to take a passenger and mails from a passenger liner at sea.

The Cunard line has associated itself with air transportation only to the extent of arranging for planes to meet the passengers on request, at either American or European terminals. The company, however, is watching the progress being made with the catapulting of mail, and reports that, as soon as it is convinced the time is ripe to introduce these arrangements on board Cunard steamers, the necessary steps will be taken.

It is interesting to note that the Cosulich Line, of Italy, made one of the earliest experiments with the ship-to-shore scheme. Several years ago it was arranged to send mail by plane from one of the company's ships in the Mediterranean to an Italian port. The project later was abandoned, however, when it was decided that the expense did not justify the benefits derived.

Economics AND THE AIRCRAFT IN

Discussed Along with Design, Engines, Production and Aerodynamics at L

By HENRY O. PATTISON, JR.
Assistant Editor of AVIATION

ONE OF the best balanced technical programs which the aircraft industry has undertaken was presented by the American Society of Mechanical Engineers, Aeronautic Division, at Dayton, Ohio, from May 19 to 22. Touching on practically every phase of aircraft, from design to operation, the papers read proved interesting both in subject matter and the discussion which they invoked.

Each paper was well presented and well received. The attendance was somewhat low on the first morning due to severe rains which prevented many from arriving on time. However, the attendance at all of the sessions was far above that of the New York Show meetings.

The laboratories and facilities of Wright Field were thrown open for inspection, regular tours being arranged each morning and afternoon. It is believed that there was probably more cooperation at Dayton between the Army and civilians than at any other similar meeting.

The Dayton meetings were opened by C. H. Ripsch, chairman of the Dayton Section, A.S.M.E.; Maj. J. E. Fickel, of Wright Field, gave the address of welcome. Orville Wright was introduced and acted in the capacity of honorary chairman of the session.

The first paper, by Roy V. Wright, of the Simmons-Boardman Publishing Co., was entitled "What the Airplane Can Do in Central and South America." This paper went into the details of all transportation systems existing in Central and South America, comparing them with air routes, both in operation and projected. Mr. Wright believed that the southern countries, with their slow transportation facilities, offered great opportunities for airways. They must, however, be handled diplomatically since the United States is not favorably looked upon in those quarters.

It was brought out in the discussion that South America was not the great market it might first appear. While there are many people there, they cannot afford to travel; hence any successful air line must carry freight and mail, and wait for future development in passengers.

Carl B. Fritche, president of the Airship Development Corp., Detroit, gave the second paper of Monday morning. He compared and illustrated by means of large charts, the cost of constructing, operating, and the field of use of the metal airship.

Monday afternoon the entire gathering assembled at Wright Field and four papers on Aircraft Production were read.

The wide difference between commercial industry and the military were discussed in a paper by Rex B. Beisel

J. Don Alexander who explained some of the savings effected by his company

Rex B. Beisel, author of a paper comparing military and commercial manufacturing

entitled "Airplane Design, Manufacture and Sales, Commercial vs. Military." The major point of this paper was that the manufacturer of present day commercial planes would find it much more difficult to enter the military manufacturing field than the manufacturer of military craft to enter commercial aviation. Mr. Beisel was of the opinion that there are fundamental differences in design which tend to prove this point.

The commercial manufacturer designs his planes primarily to carry a pay load. The military manufacturer, on the other hand, designs his planes to carry a given amount of armament, to be maneuverable and to have a specified performance. A good designer of military aircraft finds it merely part of the day's work to add an amphibion gear to an existing type, or create some other piece of design.

Another point brought out by this paper was the

T INDUSTRY

cs at Dayton Session of A.S.M.E.

Capt. Sir Hubert Wilkens and Orville Wright, speaker and guest of honor respectively at the A.S.M.E's Dayton banquet

fact that the manufacturer building planes commercially is not subject to government inspection.

On the other hand, there are many points in favor of the commercial manufacturer. He is not tied down to definite delivery dates. Those who are subject to government contracts must give a definite bid and follow this to the completion of the work. If the planes appear to be costing more than at first indicated, the manufacturer usually goes ahead at a great loss and completes them in a satisfactory manner, hoping to obtain a larger government contract for the same type of plane later and thus make up the loss. Quite frequently the larger contract is not forthcoming, leaving the manufacturer on the verge of bankruptcy. Mr. Beisel made a point of the fact that the present situation is not conducive to the production of the best types of military aircraft.

A complete discourse on past and present production facilities of the Alexander Aircraft plant was the background of a paper by J. Don Alexander of Colorado Springs, Colo. His paper, entitled "Reduction of Airplane Production Costs," opened with the statement that rapid and uniform production is the key word of the present day aircraft industry. Manufacturing economies will not be effective until the yearly output reaches five or six figures.

At the present time it is quite possible to effect economies by the proper utilization of efficient factory planning, good machinery and labor saving devices. Mr. Alexander illustrated his remarks with half a dozen incidents in which the Alexander Company had been able to lower its costs greatly.

Every manufacturing plant should encourage its workers to develop new methods by which they may do their work easier. This activity can be stimulated by offering cash prizes each month for practical ideas. The closing idea of this paper was that planes must be developed which are faster and more economical to operate if the great buying public is to be reached. The only way that the initial cost to the buyer may be lowered is by a careful and steady reduction of production costs.

The third paper of the afternoon was the "Design and Manufacture of Airplanes from the Point of View of Low Production Costs," by Russell F. Hardy of the Waco Company.

Experience gained in the automotive industry has saved the aircraft companies millions of dollars, Mr. Hardy believes. Only by close cooperation between the design and production departments will a good finished product result. The plane must not only be well designed aerodynamically but must be pleasing in general proportions to the eye.

The essential factors contributing to low production cost are an acceptable design which may be easily placed in quantity production, correct procedure regarding design and experimental work, and last, efficient production methods. Efficient production methods include well-trained personnel and good equipment, with a properly designed factory.

"Production Methods in Airplane Construction," by R. S. Damon of the Curtiss-Wright Corporation was the final paper of the afternoon. The paper stressed the fact that quantity production was mainly a relative term and present quantity production in an aircraft factory is a very low figure. When real quantity production begins, we may expect drastic price reductions, but not until many more planes per week are being built than at present.

Mr. Damon cited several problems which arise in quantity production, and directed how they might be avoided in the aircraft industry.

MONDAY EVENING, Capt. A. W. Stevens gave a very interesting talk, telling of the advances made by, and the future of, aerial photography. He illustrated his remarks by several lantern slides of aerial photographs taken by him from high altitudes.

Airplane design was the chief topic of the discussion on Tuesday morning. At this time a group of three papers were read, each giving practical details which might be of help to an aircraft organization.

The first of the three papers was entitled "German Metal Airplane Construction," and was prepared by Prof. Herbert Wagner, of the Technical High School, Danzig, Germany. The paper was presented by J. Otto Scherer of the Junkers Corp. of America. Dr. Wagner gave a very detailed study of the present types and tendencies of German metal plane construction.

In many ways the German construction is quite different from that employed in America. The newer tendency of Americans to use a monocoque metal con-

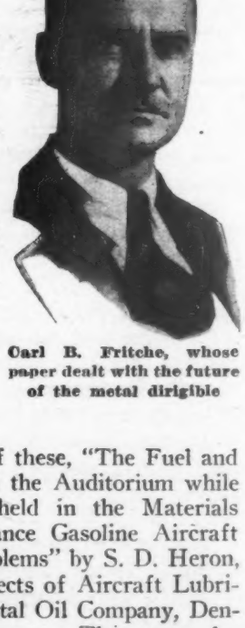
struction has not received much favor in Germany. One of the main points of this paper was a comparison in minute details of fabric and metal covered wings.

A. E. Blaisdell read the discussion which had been prepared by Col. E. V. Clark. He stated that there had been great advances made in metal monocoque construction in this country, but that commercial manufacturers were slow in adapting it. Captain Greene, of Wright Field, stated that the Army is conducting many tests on metal sheeting and investigations of corrugations are being made.

Richard M. Mock next gave a paper entitled "Airplane Wing Trussing." His opening statement was that, of all the possible variations used in airplane design, the trussing of wings was the most exploited. Mr. Mock then went into great detail and explained all of the wing trussing systems which are now in common use. This paper was very well presented and proved to be the result of much detailed study by the author. Several ways were shown by means of which the slenderness ratio could be reduced. Efficiency of wing bracing is entirely a matter of size of the plane. No definite rules may be set down by which the designer may select one wing system from another, but rather it must depend entirely upon the type, size, and use of the plane being designed.

The third paper of the morning, "Engineering Organization in the Airplane Factory," was read by E. Molloy of the Keystone Aircraft Corp. Such a paper is very timely with so much reorganization going on in the industry. Mr. Molloy described in detail the workings of the Keystone plant as a unit of Curtiss-Wright. For the manufacturer of aircraft or accessories there was much to be learned in this paper. Accompanying it were two charts showing the exact relationship between the various departments of a manufacturing group such as Curtiss-Wright.

A. A. Gassner of the Fokker Company, stated that the system of using one draftsman for each separate part of the design was best. With the executive system now employed in many factories, friction is continually arising.



Carl B. Fritche, whose paper dealt with the future of the metal dirigible

In the afternoon the buses again carried the visitors to Wright Field where two interesting and simultaneous programs were arranged. One of these, "The Fuel and Lubricants Session," was held in the Auditorium while the Aerodynamic Session was held in the Materials Building. "The High Performance Gasoline Aircraft Engine and Its Fuel and Oil problems" by S. D. Heron, of Wright Field and "Some Aspects of Aircraft Lubrication" by B. E. Sibley, Continental Oil Company, Denver, Colo., were the first two papers. They were devoted entirely to a discussion of advances made toward obtaining better fuel and oil consumption. Due to Mr. Sibley's absence his paper was presented by L. L. Davis, Chief Chemist, Continental Oil Co. Attention was paid to engines running hotter than the present day standard. The final paper of the fuel session was "The Present Status of Superchargers for Aviation Engines," by Dr. Sanford A. Moss of the General Electric Company. His paper started with a technical history of supercharging and outlined that development to its present standing.

In the Aerodynamic Session the first paper read was entitled "Practical Airplane Performance Calculations" and was delivered by Dr. Michael Watter of the Chance Vought Corp. This paper explained a new method of calculating performance based on data secured from wind tunnel experiments. If any plane is to succeed, it must meet the specifications originally called for. Dr. Watter's formulas give a new and simpler method of calculating the speed and other characteristics. This new method is based on the evaluation of parasite resistance and well-known characteristics of the engine and propellers.

Due to illness of Lieut. Carl B. Harper his paper was withdrawn for a future date. Next on the program was "The Airscrew With Minimum Loss of Energy" by Prof. Enrico Pistolesi of Pisa, Italy.

Professor Pistolesi's paper was considered the most mathematical at the Dayton sessions. He derived and developed formulae which, when the proper substitutions were made, gave the correct design characteristics of propellers.

WEDNESDAY MORNING the problems of silencing the airplane and protecting it from fire were treated by Hugh L. Dryden, of the Bureau of Standards and Lieut. Comdr. C. C. McCord of the Naval Aircraft Factory respectively. As to silence, Mr. Dryden stated that no one device can be developed which, with a slight sacrifice of weight, will completely silence an airplane. All successful aircraft mufflers work by slowing down the exhaust gases. When the engine explosion noise is muffled there still remains a considerable amount of noise. The propeller accounts for a large amount of this, while the moving parts of the engine such as gears, cams, and valves add greatly. While the general assumption is that metal propellers are noisier than wooden ones this may be accounted for by the fact that metal propellers are invariably run at a higher tip speed. The thick propeller will always make more noise than one of a thinner section.

In the discussion on Dr. Dryden's paper it was said that noise not only is unpleasant but causes both mental and physical discomfort. While the airplane is noisy, it does not have to become absolutely silenced to be improved to railroad standards. It was thought that, on the average, most tri-engined planes were quieter than single engined ones. This is due to the large amount of vibration throughout the fuselage which is found in a single-engined plane.

In his talk on fire prevention, Commander McCord gave a few general principles and showed the trend of investigations which have been conducted, both for fire prevention and fire extinguishing. At present there are no satisfactory fire extinguishers for use on aircraft. Prevention is therefore of vital importance. A great deal of experimental work is being carried on by the government and the extinguisher manufacturers, and it is to be hoped that soon much progress will be shown in fire fighting equipment.

There is no basis upon which a code might be laid down regarding the nature of equipment to be installed on military or commercial planes. Most fires start in the

engine compartment and it is there that the most prevention must be centered. It is seldom, if ever, that the engine itself, by means of exhaust gases, etc., causes a fire. Broken fuel systems, aided by hot surfaces or electrical discharges, are the usual cause of fire. The Commander's paper went into detail and described all the various fire systems now in use. In addition, he explained the more satisfactory methods of fuel system arrangement which would prevent broken or leaky lines.

IN THE AFTERNOON the setting was again transferred to Wright Field for the reading of two papers on light alloys for aircraft. In a paper entitled "Some Characteristics of Light Alloys for Aircraft" by H. W. Gillett of Columbus, Ohio, a good discussion was given on the subject of the alloys which may be expected in future years. One of the main points of this paper is that the aircraft industry is greatly dependent upon the progress made in metallurgy. Only as the science of metallurgy progresses can the aeronautical industry advance. Of all the metals beryllium shows the most promise. While it is extremely expensive at the present time, it will become reasonable in price as soon as proper methods of abstracting it are developed. There is no scarcity of beryllium ore. It is quite probable that the processes of putting a protective coating on sheets and other forms of aircraft metal to prevent corrosion will become an accepted practice.

The second paper of the afternoon, which was written and read by Lieut. A. J. Lyon, of Wright Field, was a very technical treatise on a new series of aluminum alloys including their method of manufacture and their strength at high temperatures.

WEDNESDAY EVENING the Biltmore Hotel was the scene of the A.S.M.E. National Aeronautical Banquet. Souvenirs at this dinner were prints from the original negative showing the Wright brothers on their first flight. Each print was autographed by the evening's guest of honor, Mr. Orville Wright. Talks were given by Sir Hubert Wilkins and C. S. "Casey" Jones.

In his talk Sir Hubert Wilkins stressed the great aids now made accessible to the explorer in the field of aeronautics. He stated that it is now possible to survey and map as much land in one day as it would formerly have been only in a year. "Casey" Jones' speech was one of historical nature. He discussed his early days of barnstorming and racing flying. In conclusion he stated that the army does not object to its officers entering civilian aviation, for in such pursuits they know where they may again call on them if the need arises. He stressed repeatedly the thanks that commercial aviation owes to Wright Field and the army in general for having produced the type of men now in commercial aviation, who have had their training there.

With C. H. Colvin in the chair the Thursday morning Transport Session started with a paper "Progress in Instruments for Blind Flying" by Elmer A. Sperry, Jr., of the Sperry Gyroscope Company. The Sperry Company has recently developed an artificial horizon by means of which the pilot may at all times maintain level flight. Mr. Sperry's paper was devoted to a description of that instrument. The instrument works by means of a venturi driven gyroscope, and faults previously found in the pendulum type of instrument are said to have been eliminated.

The next paper was one of the high points of the A.S.M.E. meeting. Erich Offermann of Berlin, Germany, in his paper "Economies of Airplane Transportation" bunched more truths concerning the aviation industry than are usually found in any one session. He stated that the problem of flying is the problem of the internal combustion engine. Operating reliability is the most important factor to be considered in engine design. Echoing again the feeling which was present first at St. Louis, then Detroit, and but a short while ago at New York, he warned that more attention must be given to the provision for a harmonious design of both the fuselage and engine, in order that each may develop their greatest usefulness.

There is room also for much research on the transmission of power to distant propellers, and the reserve

Below: Robert Insley, of Continental Aircraft Engine Co. He opened the discussion at the engine session

Above: Dr. Wolfgang Klemperer who read Erich Offerman's paper on economics

power of engines must be increased over that commonly found today. There are two ways of increasing the power surplus. The first is by designing a more efficient engine, and the second, by changing the airplane construction in order that less power may be needed. The two-stroke-cycle engine offers great possibilities in the aircraft field.

Regardless of their use, construction, and other features, all airplanes must take off, fly, and land. Of these three, landing is by far the most dangerous. Flying will not advance very far until landing fields are equipped with launching devices and also landing machines. Up to 35 per cent of the structural weight can be saved by reducing the size of the landing gear. If runners are placed on the airplane instead of the landing gear and launching devices employed, the entire fundamental designs of our modern aircraft must be changed. Multi-engined planes are not practical, since they merely increase the number of units in which failure may occur.

Captain Offerman suggested, as a landing machine, the use of a tread mill which could be rotated into any position. He stated in his paper that the distance in which a plane might be landed depended only upon the amount of deceleration which the passengers and plane could withstand. The paper was presented by Dr. Wolfgang Klemperer, of the Goodyear Zeppelin Corp.

CONCLUDING the morning session was a paper entitled "Design and Development of Transatlantic Seaplane" by Dr. Rumpler, Rumpler Motor Co., Berlin, Germany. The paper was presented by Mr. H. V.

Thaden, Vice-President, The Pittsburgh Metal Airplane Co., Pittsburgh, Pa. Dr. Rumpler has spent many years in experimenting with and developing large seaplanes. His paper was devoted to a description of the engineering features and possible use for a large double hulled seaplane. The plane, specifications of which are given in the separate table below, is to be powered by twelve engines. The propellers, which are in the trailing edge of the wing, are to be driven by long shafts on the engines.

It is hoped that this arrangement will be better aerodynamically than placing the engines on top of the wings. The wings will be of full cantilever type.

One point brought out by Dr. Rumpler was that it is impossible to predict with much accuracy the exact characteristics and performance of such a plane. A designer's error of 5 per cent may affect the pay load as much as 50 per cent. In any long distance plane which is working at its maximum L/D very slight variations,

General Specifications of the Proposed Rumpler Transatlantic Seaplane

Span	289 ft.
Length	160 ft.
Chord	41 ft.
Camber	87 in.
Aspect ratio	7.7
Gross Weight	232,000 lb.
Pay Load	42,000 lb.
Wing Area	9,850 sq.ft.

which increase the drag or lower the power, greatly affect the performance.

In the discussion on this paper it was brought out that the seaplane and the dirigible both have their advantages at the present time. There is much development work going on in an attempt to overcome the faults of each type. It is impossible for anyone just now to predict accurately which will be the ideal carrier for use across large bodies of water. At the present time the greatest fault with lighter than air transportation is the docking and handling facilities when the ship arrives at its terminal. The greatest obstacle which faces the designer of large seaplanes is that of hull design. Designers are faced with the problem of adding large amounts of reserve power to be used in overcoming the adhesion of the water to the hull. This greatly cuts down the pay load which would otherwise be possible.

THE FINAL SESSION at Wright Field was held at 2:15 on Thursday afternoon. At this meeting Aircraft Engines held the limelight. The first paper was that of Harold Caminez of the Allison Engineering Company. and was entitled "Trend in Aircraft Engine Development." Mr. Caminez's paper included a good discussion of all the present-day aircraft engines. Engine types are greatly influenced by the characteristics of the airplane in which they are to be used. Reviewing the old problems of the air-cooled and liquid cooled engines, the advantages and disadvantages of both types were impartially pointed out.

One of the best points brought in during the entire meeting was in the opening paragraph of Mr. Caminez's paper. He stated that every aircraft engine manufacturer firmly believes that his developments are in accord with the correct tendencies and that his latest product is the ultimate development of present day engine manufacturing. These beliefs of manufacturers tend to suppress real discussion and greatly retard the development of engines.

The majority of engines built in this country are of the radial air-cooled type. Comparatively little work or research has been done on commercial water-cooled engines. A significant fact, Mr. Caminez believes, is that the Europeans have done much to develop the water-cooled engine and at the present time practically all important world's record for speed, duration and distance are held by water-cooled engines. At the present time there is too much cognizance taken of the first cost of an engine. In reality, the first cost means little; developing, engineering and servicing costs on engines represent a large percentage of their total cost. It may, therefore, be expected that engines increasing reliability and performance will do more to lower the ultimate price than cheaper and simpler production methods which do not improve the product.

Next was a paper, "Vibration Characteristics of Aircraft-Engine Crankshafts," by Prof. Ford L. Prescott of Wright Field. This paper gave some of the most valuable scientific data obtainable at the sessions. Prof. Prescott has spent much time in calculating the torsional-vibration characteristics of engines, and gave most of his results in this paper. In obtaining his results, he designed a special instrument which automatically plots torsional displacement against time.

The final paper at Dayton was that entitled "Installation of Air-Cooled Radial Engines" by P. B. Taylor of the Wright Aeronautical Corp. The paper told of the installation problems which might be met with radial air-cooled engines. Many improvements are to be desired; it is quite probable in the near future better cowling will be developed, and the ultimate cowling will probably be one in which the exhaust manifold is incorporated.

The airplane manufacturers and the designers both are at fault as matters now stand, since neither one has accurately studied the installation situation to obtain aerodynamic and engine efficiency. Working as they are now, each one takes the edge off the others product.

Two papers were presented by title only at Dayton: 'The Principles and Development of Air Law," by Prof. Andre Henry-Courannier, of Paris, and the "Summary of Aerodynamics of Leonardo Da Vinci," by Prof. Gracomelli, of Rome, will be published at a later date.

IN CONCLUSION it may be stated that the Dayton meetings were more than usually successful. They were well attended by the various members of the industry and discussion on all of the papers was easily obtained. Contrary to the expectations of those in charge, the Wright Field inspection trips did not draw especially 'arger crowds. The officers of the field were extremely cordial and every arrangement had been made to properly display the various activities at the field. With Lieut. Mills in charge, the officers' committee at the field conducted their part of the Dayton meetings much to everyone's satisfaction. Wednesday afternoon an exhibition of flying was accorded to the visiting A.S.M.E. members, which was quite apart from the usual flying show. In this particular exhibition the officers demonstrated the methods employed at the field in flight testing a plane. Much of the credit for the success of Dayton goes to the officers of Wright Field.

PROBLEMS OF THE *Small Dealer*

Regarding the Methods and Policies to be Adopted by Him in Building Up an Efficient and Profitable Organization

By ROBERT MORRIS BURTT

The Alton Flying Service Airport at Columbus, Mo.

I HAD JUST LANDED on my home airport one Friday afternoon from a week's flying around my territory, soliciting and opening new dealers for the line of aircraft that I represented. Pleased with the prospect of a few hours to look over the accumulation of a week's mail, I entered my office to find that there was a gentleman to see me, in fact had been waiting all day for that purpose. He introduced himself.

"My name's Jackson," he stated, "from Podunk." "You may remember having been there about a month ago. I was present at a luncheon when you made some remarks about the future of aviation." (I wondered who I had insulted or what extravagant statements I had made.) "I am not here to buy any airplanes though I do not say that I won't sometime in the future, however, that depends on what I learn from you. I am in the automobile business and have the distributorship for _____." (naming a well known make of car). "Both I and some friends of mine have been talking over some of the things you said and I have been delegated to come up here and see you. We feel that some one in our community is going to go into the aviation business and we have decided that if there is any sound business future to it that we might as well be the ones to start such an enterprise.

"In short we want to know what likelihood of success such a prospective business would have in our city and trade territory (the city in question was one of 25,000 population in the midst of a prosperous agricultural area) and, provided the chances for success are good, how to get started and what to do afterward."

I saw that here was an honest seeker after information. I recognized that by giving him a sincere presentation of the facts, as I saw them, I would accomplish two results. In the first place I would secure an excellent prospect for the products of the company I represented, who would be very kindly disposed towards me, and in the second place, provided I did do business with him on such a basis, there would be no kick-back or claim of misrepresentation in the future.

Right here I think it is very appropriate to inject a word of condemnation against those, and of whom there are entirely too many in the aviation business, who make a practice of spreading an immense amount of extravagant hokum concerning the marvelous opportunities of making quick fortunes that exist in the aviation business. I remember hearing the concluding part of the sales presentation of a salesman representing another company. It went something like this:

"and thus getting your flying field free from the city, if you work it right, figures from other fields show that you should easily get 100 students the first year at an average of $500.00 per student. Fifty per cent of these students will buy planes from you, each sale producing a profit on the average of $1,500.00. There's a profit right there of $75,000.00 to say nothing of sales to outsiders, gas and oil, hangar rent, repairs, service work of all kinds, and so forth and so on."

It is my experience that salesmen that go out with a "line" like that lose their jobs after awhile but in the meantime they have done a lot of irreparable damage both to their own firms and to the industry at large.

"I am going to answer your first question last," I went on to my visitor, "for the chances of success depend absolutely on how you get started and your procedure following. The first step is to provide yourself with a flying field. I presume you have a showroom in your business probably along with a service department and repair shop in the rear. Now the flying field is the corresponding place of business in aviation. It should be as close to town as possible but yet free from dangerous hazards around it, such as trees, buildings, telephone poles and wires, etc. The size of the field necessary will be determined by the number of, or lack of, the above named hazards.

"There are two main methods of obtaining a flying

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field. One is to go out and buy it yourself with private capital—the other is to arouse the interest of the city in having a municipal airport and buy it through a bond issue. The first is preferable for then you can always be your own master and do what you please, however, that method is often prohibitive due to the amount of capital required. If the latter, space and right to use the field can be leased from the city at a nominal yearly rental. If possible, however, a contract should be entered into with the municipality, giving you the exclusive right to operate the field for the city. This is very advantageous for it gives you additional sources of revenue, such as all gas and oil sold on the field and the right to either operate yourself or lease out other valuable concessions. Many cities are glad to do this because in many cases they are finding out that it is inefficient for them to be in the aviation business, which is what it amounts to if they attempt to operate the field themselves. A fair rental for the exclusive right would be the interest on the bonds sold representing the total investment in the field, buildings and general equipment."

My visitor interrupted me at this point.

"But it looks to me as though I'm going into a lot of things besides selling airplanes. I'm primarily a salesman and I thought that I could use my car selling experience in this field. I'm not particularly interested in a lot of operations."

"I'M GLAD you brought that up," I returned, "because it brings out a point that is very important. You can use your car selling experience to great advantage, as I will show you, but there is a basic difference between your present business and the one you are contemplating, which I shall try to explain.

"In the conduct of your business the selling of new and used cars is the main department. You also repair cars, sell gas and oil, rent storage, sell accessories, and do all kinds of general service work. It has been said that the success of the automobile dealer lies not in his showroom but in the class of service he gives back in his shop to the owners who have bought cars from him. Your success in this department, however, can be traced directly to the showroom, for the same selling ability that sold the cars has to sell your service back shop. In other words, the foundation of your business is sales ability.

"Now in aviation the selling of planes will not be your main department, as it is in your car agency. The situation will be reversed. Your operations department, which is akin to your service and accessory work, will be your main consideration. Whether this will be true ten or fifteen years from now I am not prepared to say but there is no question but that it is at present. However, the prime requisite for success here, as in your car service department, is sales ability. You are always selling no matter whether it be a flying school course, a cross-country flight, or just a short hop around the field."

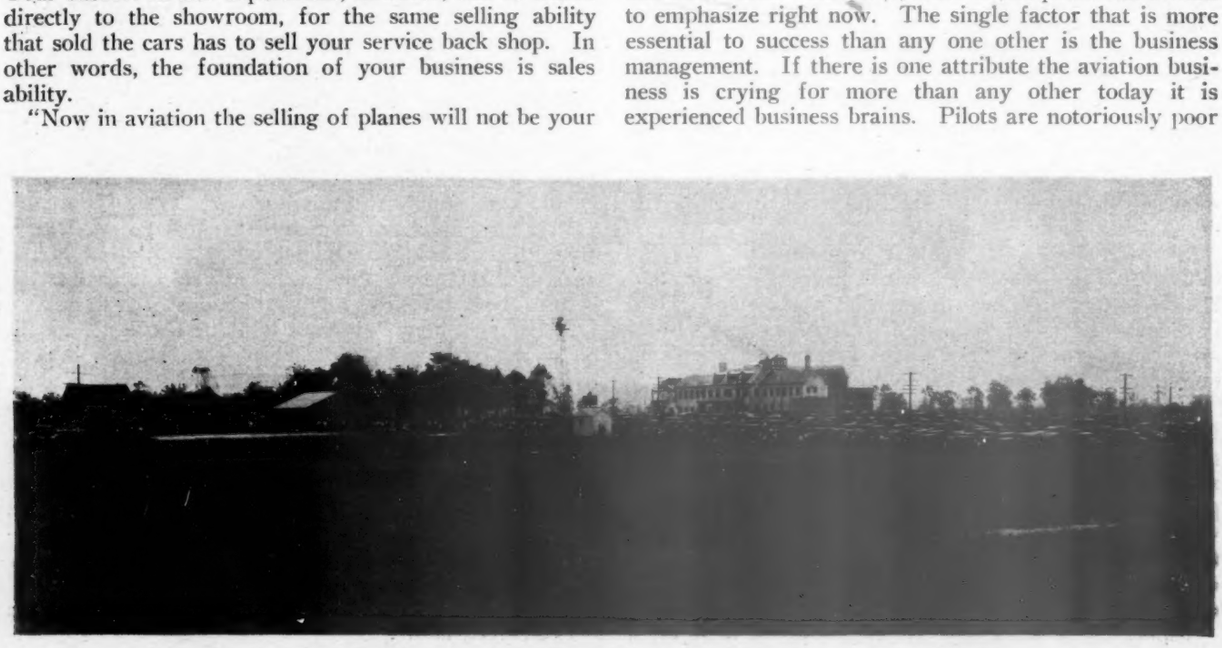
"Well, that sounds better," stated my visitor. "I can begin to see where I could fit into a picture like that. Now what do you do after having acquired a field?"

"The next step is the proper equipping of the field," I returned. "And that will be determined by the amount of money you can afford to invest. However, whether the field will be municipal or private, after the surface of the field is put in proper shape for flying, a medium sized hangar should be constructed, which should accommodate at least five average sized ships. A small office should be provided as well as shop facilities. Convenient gas and oil service are essential. To have night lighting equipment is very advantageous but not necessary, however, it should be added as soon as possible. This problem of layout and equipment is a specialized subject in itself and is individual in every case. We have an airports department in our business and I will be glad to arrange for an engineer to visit your city, look over the situation and make the proper recommendations."

"I can readily see," said Mr. Jackson at this point, "that the basic investment in the aviation business far exceeds that required in the automobile."

"That's true," I returned. "Instead of the limited space of a showroom and shop you have a whole flying field and the space required to store five airplanes will store 25 automobiles easily. This fundamental difference will tend to keep out the inadequately financed fly-by-night dealer and will bring into the business only those of proven worth and unquestioned integrity.

"After the flying field and equipment is provided for the next step is to make arrangements for operating and sales stock. However, there is one point that I want to emphasize right now. The single factor that is more essential to success than any one other is the business management. If there is one attribute the aviation business is crying for more than any other today it is experienced business brains. Pilots are notoriously poor



The Allton Flying Service Airport at Columbia and a typical Sunday crowd

business men. I therefore urge upon you the necessity of placing yourself or some other man of proven judgment at the head of the enterprise. If this is provided for, the business will succeed. You will have to hire some pilot who will oversee flying operations, probably doing a great deal of it himself. Be guided by his suggestions but use your own judgment.

"EXPERIENCE has shown that in the formation of such a business as you contemplate a natural division of activity, and consequently, departments will take place. Your main sources of revenue will come from the operation of a flying school, cross-country trips and short local sightseeing hops, sales of planes, sales of gas and oil, and miscellaneous repair and service work of all kinds.

"In order to do any kind of flying you will have to have an airplane therefore your first problem will be what to buy. You will be besieged by many salesmen, each with a different 'line' and line of ships. Beware of the fellow who tries to sign you up on a contract requiring the maintenance of a certain schedule. You don't know how many ships you are going to sell the coming year! You may not sell any and still make money. Of course requirements in individual cases will vary but to start in a simple way you should have a good rugged training ship and one, probably a cabin job, suitable for cross-country trips and short hops.

"The make of plane you represent will not be as important today as it will ten years hence. In the automobile business this is not so because a dealer is known and spoken of by the make of car he handles. However, in the early days of the automobile this was not so, he was known as the local man selling 'horseless carriages,' and you will be known locally as the 'airplane man' and your flying field as community headquarters for aviation.

"You will come in contact with factory representatives selling only one plane and with others that represent groups of companies which have a line of as many as fifteen or twenty planes. Sometimes it is an advantage to sign a contract with such a company both for the prestige it gives you and also the wide variety of products which you can buy on one contract. If, in order to offer a complete line of ships, you sign several contracts with different manufacturers you lose the opportunity of purchasing all of your requirements from one manufacturer, whose contract, if on a sliding scale, as usual, permits you greater discount possibilities, by so pooling your purchases.

"It is most wise, if possible, to have your school endorsed by the Aeronautics Branch of the Department of Commerce by the procurement of an Approved School Certificate. As soon as your field is opened you will be visited by an Inspector for the government whom you will find to be very courteous and eager to help you in any way possible. In fact this gentleman will be able to give an untold amount of good advice.

"Experience has shown that in attempting to sell planes it is unwise and uneconomical for the average small dealer to try to cover a considerable territory, making sales demonstrations, trying to open up subagents, or close retail sales. It costs money to fly airplanes and the trade is beginning to discover that. Except in very unusual circumstances no long cross-country flights should be made in the hope of closing a sale. Charge for the trip—the prospect will respect you more! Confine all your sales demonstrations flying to the home airport.

"A further factor of considerable importance in the consideration of the small dealer is that of insurance In the case of the larger operating and distributing companies whose field of activity covers a wide area and perhaps the whole country, their operations run into such large figures that they can buy insurance at a wholesale rate, thus cutting down the cost for each particular unit. In the case of the small dealer that is impossible. He has to pay the full retail price for insurance. It is easy to see why the larger operating companies thus covered can afford to do a lot of cross-country work and flying of like nature which the small dealer cannot afford.

"If you are on or close to any of the main airways of the country you will be surprised at the amount of business you will pick up from itinerant planes. One little airport out in Kansas has averaged three visiting planes per day for the past six months. Your sales of gas, oil and small supplies of various kinds, hangar rent, repairs and accessories are essentially your 'bread and butter.' By careful management this can be made to pay your fixed overhead.

"The personnel requirements of such an organization are small. A business manager, stenographer and bookkeeper combined, pilot and mechanic are ample and in some cases the work can be handled by less than four.

"LET ME REFER again to the subject of business management. I believe that therein lies the crux of the matter. It is all important. The manager will take care of the office and all business arrangements, particularly everything that has to do with financing or handling accounts. His big problem, as well as that of the entire organization, is to sell his community, not airplanes, flying courses or cross-country trips, but the very idea of aviation itself. If the basic significance of flying, its utility, safety and practicability, can be sold to the home folks, all these others will follow. There will be flying students, cross-country flights, sightseeing hops, and sales of planes. All of this activity will result in a certain average number of pay flying hours per day, which, of course, will vary according to the size of the business and the community in which it is located, but which is absolutely essential to success.

"The confidence of the community will only be won through the most dogged watchfulness and care. The pilot should be instructed never to take any chances. Air planes are gradually being made better and more staple and scientific developments are slowly coming which will enable the operator of aircraft to overcome the handicaps of bad weather. However, leave all such experimentation to those who are equipped and qualified for such work.

"You will be able to utilize many of the up-to-date selling methods which you have used successfully in your automobile business. If you merchandise aviation methodically and persistently you will succeed. While the pilot is taking care of the actual flying and mechanical work at the air port you will be out selling. You will have a very friendly contact with your local paper and you will find a ready ally there for the furtherance of your plans. You will be good news for the paper and if you are on your toes you can receive the benefit from an immense amount of advertising through the news columns. You will have a prospect list of possible plane owners, flying and ground school students, and business men who can profitably utilize cross-country trips. You will work these lists by direct mail, telephone and personal interview. When the weather is too bad for flying you will have your pilot down selling, also."

GENERAL NEWS

HERBERT F. POWELL, *News Editor*

Fokker Becomes Holding Company

Titled General Aviation Corp.; to Add U. S. Dornier

NEW YORK (N. Y.)—Acquisition of the Dornier Company of America is planned by a new holding firm to be known as the General Aviation Corp., of which Fokker Aircraft Corp. will form the nucleus and General Motors hold large interests.

The announcement made by Harris M. Hanshue, president of the Fokker company, states Fokker will change its name to the General Aviation Corp., primarily becoming a holding company, while the future manufacture and sales of Fokker planes are likely to be carried on by a subsidiary unit.

No Stock Exchange Contemplated

By virtue of the fact that General Motors owns 40 per cent of the Fokker stock, and formed, with Fokker the Dornier Company of America last October, it is expected the automotive concern will own a majority of stock in the new corporation.

As no exchange in stock is planned by the General Aviation Corp. for present Fokker shares, General Motors will have a 40 per cent interest in the new organization prior to the taking in of the Dornier concern.

Mr. Hanshue said that negotiations are being carried on with a view of obtaining other companies for the new holding firm and for that reason, it is recommended that Fokker by-laws be amended to permit raising the capital stock from 1,000,000 shares to 5,000,000 common shares no par value.

States Reasons for Move

A portion of the announcement issued by Harris M. Hanshue reads as follows:

"It is stated that the change of the corporate name and the increase of the authorized capital stock of the corporation was proposed to enable the directors to carry out an expansion program which contemplates that the Fokker corporation will become primarily a holding company owning stock in subsidiary manufacturing and operating companies whose managements and activities will be unified through control maintained by the parent corporation.

"If the stockholders approve the proposed changes it is expected that the manufacture and sale of Fokker airplanes will be carried on by a subsidiary corporation which will be wholly owned by the 'General Aviation Corporation.'

"In conjunction with General Motors Corporation, which owns 40 per cent of the issued common stock of the present Fokker corporation, arrangements have been made for the right to manufacture and sell Dornier flying boats.

"A new corporation called the Dornier Company of America has been recently organized under the laws of Delaware and it is expected that this company will also become a wholly owned subsidiary of 'General Aviation Corporation.'

"The new Dornier subsidiary will employ the services of Dr. Dornier, inventor of the Dornier flying boat which has been successfully developed and operated in Europe, and expects to engage in the manufacture of new types of Dornier flying boats adapted for use in this country.

"The carrying out of the plan does not involve any exchange of the existing shares for new securities. It is stated that the $4,000,000 additional shares of common stock without par value, which it is proposed that the 'General Aviation Corporation' shall be authorized to issue if the amendments are approved by the stockholders, will be issued for the acquisition of additional property for which negotiations are now being carried on."

Complete Tests of New Northrop

LOS ANGELES (CALIF.)—Satisfactory completion of factory, field, and flight tests of the new all-metal, Northrop, low-wing, cabin monoplane has been announced by officials of the firm. The new plane is built of pressed and stamped flat duralumin sheets assembled by riveting. Designed for light transport service and mail carrying, the craft is powered with a Wasp engine. Directors of the Northrop company, which is a subsidiary of the United Aircraft Transport Corp., will meet shortly to consider plans for extensive additions to the factory on United Airport, Burbank, preparatory to large scale production of the low-wing machine. Northrop is also continuing work on the development of its flying-wing type monoplane recently given a public showing following a long series of flight tests.

Elect Officers of Fowler Firm

NEW BRUNSWICK (N. J.)—Officers of the Fowler Airplane Wings, Inc., New Brunswick, recently elected were Harlan D. Fowler, president; M. Hartley Dodge, Jr., and John Frisch, vice-presidents; and Floyd F. Stein, secretary-treasurer. The Fowler firm manufactures a variable area wing so devised that the variable extension can either be used or omitted.

Name Gordon Bennett Balloon Race Officials

CLEVELAND (OHIO)—Directors of the National Air Races of Cleveland, Inc., the non-profit organization promoting the Gordon Bennett International Balloon Race, have named those who will officiate at that event when it gets under way here on Labor Day.

The operations officer in charge of the race will be Capt. William E. Flood of the Army, who has held the same position at previous races, while Lieut. Charles E. Bauch, U. S. N., will be referee. Major Albert Bond Lambert, St. Louis, was named starter, and P. N. Litchfield, Goodyear-Zeppelin Corp., president, chairman of the technical committee.

Timers will be Maj. Luke Christopher, secretary of the Contest Committee of the National Aeronautic Association, and Carl F. Schory of Pittsburgh.

Orville Wright, and Col. Clarence M. Young, David S. Ingalls, and F. Trubee Davison, Assistant Secretaries of Commerce, Navy and War for Aeronautics, respectively, will act as judges. C. G. Andrus, chief of the airway weather station at Cleveland Airport, will be aerological officer.

The official name for the race and attendant two-day aerial exhibition is "The Gordon Bennett International Balloon Race and Aerial Carnival." It has been decided to hold the second national glider contest as one of the events. The first glider contest was staged here last year during the National Air Races.

Republic Steel Offices United

YOUNGSTOWN (OHIO)—Consolidation has been completed of the sales headquarters of the Central Alloy Division, Republic Steel Corp., formerly located at Massillon, Ohio, with the general sales offices in this city. J. M. Schlendorf, former vice-president in charge of sales at the Central Alloy Steel Corp., is now general manager of Republic Alloy sales; and L. D. Mercer, formerly sales manager of the Central Alloy sheet division, will fulfill the same duties for the Republic Steel Corp.

Miami Passes Licensing Law

MIAMI (FLA.)—An ordinance establishing rules similar to Department of Commerce regulations has been passed here covering the licensing of planes and pilots who operate within the city limits. J. B. Puckett, Florida inspector for the chamber of commerce, will have charge of its enforcement.

VanOrman in Bennett; Name Army Balloonists

HOUSTON (TEX.)—Ward T. VanOrman of Goodyear, winner of last year's international balloon race, will not compete in the National Elimination Balloon Race from Houston, Tex., on June 10. A crew composed of Roland J. Blair, a junior airship pilot with the Goodyear-Zeppelin Corp., and Frank J. Trotter, a Goodyear student pilot, will represent that firm in place of VanOrman.

VanOrman, by virtue of his winning last year's Gordon Bennett International Balloon Race, automatically becomes eligible for this year's international contest. His decision not to take part in the Houston race was made after a conference with P. W. Litchfield, president of Goodyear, and other officials, and follows a precedent established last year by the Army Air Corps.

The Army Air Corps has selected the following teams to participate in the elimination race:

Lieut. Walter D. Buie (pilot), of Langley Field, Va., and Lieut. John P. Kidwell (aide), of Scott Field, Belleville, Ill.

Capt. Karl S. Axtater (pilot), of Wright Field, Dayton, Ohio, and Lieut. Ralph E. Holmes (aide), of Fort Sill, Oklahoma.

Lieut. William R. Turnbull (pilot), and Lieut. Courtland M. Brown (aide), both stationed at Scott Field, Belleville, Ill.

The Operations Officer for the Army Air Corps teams is Lieut. Haynie McCormick, who is stationed at Fort Sill, Okla.

Expect 25 Planes in Penna. Tour

PHILADELPHIA (PA.) — Approximately twenty-five planes from all sections of Pennsylvania are taking part in a nine-day air tour of the state starting from Pittsburgh on Decoration Day. The goodwill flight, being promoted by the Aero Club of Pennsylvania, will visit eighteen cities, among them Philadelphia.

Actuarial Body Studies Aero Branch Statistics

WASHINGTON (D. C.)—Department of Commerce statistics on safety and accidents in civil aeronautics have been made available to the Actuarial Society of America, word from Col. Clarence M. Young, Assistant Secretary of Commerce for Aeronautics, reveals.

"We believe," Colonel Young said, "that a great many people do not take advantage of air transportation in any form either because of a lack of knowledge as to the limitations of their life insurance policies or because all the life insuring companies have not as yet liberalized their policies with respect to aeronautics.

"Recognizing that we could be of assistance to the people who want to fly—to the life insurance companies and to the operators of aircraft, we have placed our files at the disposal of authorized representatives of the Actuarial Society of America who now are engaged in compiling detailed statistics which should be reflected in the future attitude of the life insurance profession toward air travel."

Advertising Carried by New England Firm Ship

DELIVERY of the first small airship to a corporation for commercial use was made at Newark last week by the Goodyear-Zeppelin Corp., this city. The new dirigible, christened the "Neponset," will be operated by the New England Airship Co. of New Bedford, Mass. Test flying of the ship, pictured above, has been in progress at Akron for several weeks.

As will be noted, the airship carries the name of a rug and roof manufacturer on its sides. This represents a venture in the advertising field, space on the side of the ship having been rented to the Bird concern.

The "Neponset" is practically a duplicate of several of Goodyear's private fleet. It carries 86,000 cu.ft. of helium gas, is 128 ft. long and 36 ft. in diameter, and is powered by two five-cylinder Siemens-Halske radial engines.

HIGH POINTS in the NEWS

▶ *For holding.* General Motors interests involved in General Aviation Corp., a new holding firm formed by Fokker Aircraft Corp. Dornier Company of America is to become a subsidiary.

▶ *Bandied again.* Navy helium question crops up in House hearings being held on Englebright bill, authorizing completion of Amarillo gas plant.

▶ *Five.* Derbies to the National Air Races this year will be composed of two events for women and three for men.

▶ *In the Northwest.* Some twenty planes and gliders are expected to be on display at the Northwest Aircraft Exposition, June 2-7, being managed by Ray Krimm.

Airports and Airlines

▶ *Only 34 hr.* Schedule connections now available over Pittsburgh Airways, Stout, Boeing, and Eastern Air Express lines afford passengers a 34-hr. air service from New York to California.

▶ *Twice daily.* Varney Air Lines offers twice-a-day passenger service on its mail line between Portland, Pasco, Boise, and Salt Lake City.

▶ *Looking ahead.* Tulsa, Okla., is selected as scene for Aeronautical Chamber of Commerce third annual National Airport Conference, held this year at Buffalo.

Foreign

▶ *Lauded.* Twenty-three-year-old Amy Johnson is praised for her solo flight from England to Australia in nineteen and one-half days. Moth used.

▶ *Coming nearer.* Graf Zeppelin flies northward over South America after completing 4,000 mi. Seville to Pernambuco leg in 61 hr.

Nebraska Tour Lengthened

LINCOLN (NEB.)—An extra day has been added to the second Nebraska air tour, making it extend from June 23-29, inclusive. Omaha, Falls City, and Lincoln chapters of the National Aeronautic Association are sponsoring the event. Some forty planes are expected to enter the tour, the tentative schedule of which is as follows: Start at Lincoln on June 23, to Fremont for lunch, to Columbus for afternoon, to Norfolk for the night; visit Niobrara, O'Neill, and Valentine the second day; third day, Chadron, Alliance, and Scottsbluff; fourth day, Ogallala, North Platte, and Broken Bow; fifth day, Holdrege, Kearney, and Hastings; sixth day, Fairbury, Beatrice and Falls City; seventh day, Nebraska City and Omaha. Milligan and Hebron are likely to be added to the list of stops.

Perfect Arrangements For R-100's Reception

MONTREAL (QUE.)—Arrangements being perfected for the arrival of the R-100 and the crowds attendant thereupon include one-way traffic regulations on roads leading to and from St. Hubert Airport, special train facilities to the field, and radio broadcasting hookups.

(Despite some damage to the dirigible's stern incurred during a recent 21-hr. test flight, reports received as AVIATION goes to press indicate the ship is starting for Canada this week as per schedule.)

Spectators are being advised to leave their automobiles at home and journey to the airport by train following investigations of travel conditions by the R-100 traffic committee. The Canadian National will despatch ten trains an hour to St. Hubert the day of the airship's arrival, according to officials of the company.

Though no newspaper men are to be carried on the flight from London to Canada, after the departure from Cardington news of the crafts progress will be despatched from the R-100 every 6 hr.—at midnight, at 6 a.m., at noon, and at 6 p.m. Greenwich Meridian Time.

To Describe Approach by Radio

Broadcasting of the ship's arrival will commence over a Canadian National and Bell Telephone Co. system as soon as the dirigible approaches St. Hubert Airport and will carry a description of the event to points throughout the Dominion and the United States.

A list of the R-100's personnel contains the following: Maj. G. H. Scott, commander; Squadron-Leader R. S. Booth, captain; Squadron-Leader E. L. Johnson, navigator; Capt. G. F. Meager, first officer; Flying Officer M. H. Steff, second officer; Lieut. Comdr. N. G. Atherstone, additional officer; M. A. Giblett, meteorological officer; and Maj. R. B. B. Colemore, wing commander. It is believed that Sir Dennistoun Burney, managing director of the Airship Development Co., which built the R-100, will also make the trip.

Special Rules for Planes

The Controller of Civil Aviation of Canada has promulgated a code regarding aircraft operations in the vicinity of the ship which follows:

" 'That while the R-100 is under way, or not actually moored, no aircraft in flight shall approach nearer than two miles of the airship;

" 'That during the mooring of the airship, no other aircraft shall be in flight within three miles of St. Hubert Airport, Montreal, P. Q.:

" 'That when the airship is moored at St. Hubert Airport, no aircraft shall fly at any height over the area bounded as follows: Runways 'A' and 'B' on the East and South; the Savanne road on the West and North;

" 'That no aircraft shall fly directly over or under the R-100 at any time regardless of height.' "

Lycoming Speeds Production

WILLIAMSPORT (PA.)—The Lycoming Manufacturing Co., a subsidiary of Auburn Automobile Co., reports that its production schedules now in effect call for shipments of five engines a day to the Stinson Aircraft Corp. during May. Present schedules have been stepped up approximately 90 per cent recently, says W. H. Beal, vice-president.

Survey Shows Flying Attracts Average Man

NEW YORK (N. Y.)—There has been received here results of a survey conducted by National Airways, Inc., on "who is learning to fly and why?" The report discloses that the majority of those taking up flying are composed of the average men one meets every day in shop and office.

Says Capt. A. W. Reeves, "We found that there were four main classes of students and that they were learning to fly for three main reasons. Class one, the largest class, is made up of skilled artisans, machinists, tool makers, etc. Class two is made up of unskilled workmen, principally factory workers.

"Class three is made up of business and professional men who are in independent positions, and class four is made up of college and high school students.

"We found the three main reasons for these men wanting to fly were: First, a desire to become professional pilots; second, a desire to enter aviation in some other capacity than as pilots—designers, mechanics, salesmen, airport managers, etc.; third, a desire to own and fly their own airplanes for business and pleasure."

Commercial in Full Production

LOS ANGELES (CALIF.)—Full scale production has been started at the factory of the Commercial Aircraft Corporation, Ltd., Los Angeles Metropolitan Airport, with receipt of an order calling for 20 Sunbeam cabin biplanes to be placed in service on the lines of Continental Air Express. The plant is now manned by a crew of 35 men under the supervision of A. B. Green, general manager, and plans to reach a production schedule of one plane a week by July. The Sunbeam is Wright powered.

Test Chevrolet "Gee Bee"

SPRINGFIELD (MASS.)—Successful initial test flights of a Granville Brothers "Gee Bee" plane powered with the new Chevrolet Aircraft Corp. 100-110 hp. four cylinder engine were made here Sunday, May 18, states E. C. Burghduff, sales engineer of the Chevrolet firm, located at Baltimore, Md. Experimental flights with the in-line, inverted, air-cooled plant cowled will be made during the coming month. Without cowling, a speed of 109 m.p.h. was reported during Sunday's trial flights.

House Holds Hearings On Navy Helium Supply

WASHINGTON (D. C.)—Whether or not the Bureau of Mines helium plant can meet the requirements of the Navy is being discussed in the House Mines and Mining Committee during a series of hearings on the Englebright bill. The purpose of the Englebright bill is to authorize the government to complete acquisition of the Cliffside structure at the Amarillo (Tex.) plant. An appropriation of $90,000 is asked for.

The House, meanwhile, has approved the Naval Appropriations bill authorizing the transfer of a fund of $166,000 to the Bureau of Mines for the procurement of helium. It is believed that completion of the plant is thus taken care of even if the Englebright bill is not passed.

Testimony was given before the mining committee on May 20, by Comdr. S. M. Kraus of the Navy Bureau of Aeronautics, who made the statement that the Bureau of Mines has been unable to meet the Navy demands for the gas.

Commander Kraus said that the Navy Department took all of the output of the Bureau of Mines plant and repeatedly asked for more. At the end of 1928, he said flying with helium-filled airships would have been stopped, or at least seriously curtailed by shortage of the fuel had it not been for purchases from a private concern, The Helium Co.

Representative Englebright, however, stated that the testimony of the Bureau of Mines Director, Scott Turner, during a previous hearing refutes the contention that the Amarillo plant has been unable to meet the needs of the Navy.

The director stated that his records do not show any specific request from the Navy for helium and no reply from the Bureau of Mines that the helium could not be provided. It was also claimed by bureau officials that the Navy has paid more for its gas from the private plant than the government plant would have charged. During later hearings on the subject, the committee will allow representatives of The Helium Co., Louisville, Ken., to present its case.

Goodyear Pilot to Fly on Graf

AKRON (OHIO)—Karl Fickes, assistant manager of airship operations at the Goodyear-Zeppelin plant here, will fly to Germany aboard the Graf Zeppelin, following an arrangement made between Dr. Hugo Eckener and P. W. Litchfield. Mr. Fickes will make the trip to gain training experience pertinent to the operation of ships on the projejcted Pacific and Atlantic zeppelin lines. Upon arriving at Friedrichshafen, he will spend some time studying construction methods employed at the Zeppelin works. Assistant manager Fickes has been with the Goodyear company since 1922, first becoming a member of the aeronautics department. Last summer he piloted the airship "Mayflower" during radio tests.

Five Derbies Planned To National Air Races

CHICAGO (ILL.)—Five air derbies will be held in connection with the National Air Races at Chicago, September 23-31 inclusive, states an announcement issued by Maj. Reed Landis, publicity director of the National Air Race committee.

Two of these events are for women, one being a California to Chicago course for planes in the 800-cu.in. displacement class. Entrants in the Dixie derby, being held for machines in the 510-cu.in. displacement division, will fly down the Atlantic Seaboard for approximately two thousand miles, turn westward and skirt the Gulf of Mexico, and then proceed up the Mississippi Valley to Chicago.

A non-stop flight will be staged for men, while there will also be a New England derby, starting from Boston, and a Quaker derby, commencing at Philadelphia. Details of the routes, however, are not forthcoming at this time. Plans are being made by the committee to have the derby fliers brought over the finish line in proper order instead of stringing out hit-or-miss fashion as in previous years.

Daily gliding contests, parachute-jumping, and dead-stick landings are among the new features added to the National Air Race program. It is stated that when bad weather or some other unforeseen obstacle interferes with the schedule, events thereby delayed will be scratched off the card and held the following day.

Parking space on the Curtiss-Chicago Airport grounds will be provided for visting planes during the hours of show activity, but craft not entered in the races will not be allowed to remain over night and their owners should reserve hangar space at nearby airports. Visiting machines will only be permitted to land and take-off between the scheduled events.

Clifford Henderson is again managing director of the National Air Races, while all field operations will be supervised by Maj. R. W. Schroeder. Aiding these officials is Capt. Max M. Corpening, secretary of the Chicago Air Race Corp.

N.A.T. Officials Named

NEW YORK (N.Y.)—Following the recent assumption of control of National Air Transport by United Aircraft & Transport Corp., it has been announced definitely that Col. Paul Henderson will continue as vice-president of N.A.T.; Joseph F. McCarthy, comptroller of United, has been named secretary and treasurer of N.A.T.; Lester D. Seymour, general manager of N.A.T., will continue, and Curtis Barkes, head of the N.A.T. Auditing Department, has been named assistant secretary and treasurer of the company. As announced before, Frederick B. Rentschler, president of United, is president of N.A.T.

Three of those arranging for the Great Lakes Air Cruise are shown above. Pictured from left to right are: Paul Strasburg, survey pilot; Edward J. Hill, cruise chairman; Wayne J. Sheldon, cruise commander.

Lockheed Schedule Announced

LOS ANGELES (CALIF.)—Capt. B. Squier, manager of the Burbank plant of the Lockheed Aircraft Co., Detroit Aircraft Corp. subsidiary, has announced the factory is working on a schedule of ten planes per month and that 200 persons are employed. Reports state most of this production is centering on machines of the "Sirius" model, similar to Col. Charles A. Lindbergh's low-wing monoplane.

A $9,000,000 Error

In the review of Maj. Leslie MacDill's paper, read before the New York Show meeting of the S.A.E., printed in the May 17 issue of AVIATION, it was stated that . . . "profit on all Government contracts could amount to no more than $1,000,000 per year as the present budget stands . . ." That is incorrect and we take this opportunity to print the exact draft of the speech: "Military appropriations averaging $50,000,000 for equipment and Post Office appropriations for contract Air Mail not exceeding $15,000,000, lead to the Government feeding something like $65,000,000 worth of business a year into the industry. From supplying equipment, a profit of not more than $10,000,000 a year will be derived. Mail contracts should not use up equipment at any greater rate than a third of the yearly appropriation of $15,000,000 and the profit on manufacturing this equipment may not exceed $1,000,000."

Form New Air Corps Classes

WASHINGTON (CALIF.)—The Chief of the Army Air Corps has selected 236 civilian and enlisted men for flight training at the two Primary Flying Schools of the Army Air Corps. Training will commence on July 1 for this group, of whom 91 civilian and 23 enlisted candidates will go to Brooks Field, San Antonio, Tex., and 112 civilian and 10 enlisted candidates to March Field, Riverside, Calif.

Arrangements Effected For Lake Cruise Survey

DETROIT (MICH.) — A Fokker amphibion belonging to Gar Wood, motor boat builder and racer, is leading a pathfinding group around the proposed Great Lakes Air Cruise route, Wayne J. Sheldon, cruise commander, announced. This pre-cruise flight was supposed to start May 26, with Duke Schiller piloting the Fokker and Mr. Wood accompanying the party in his plane. As well as the Fokker, an Eastman Flying Yacht, flown by Paul Strasburg, veteran Great Lakes over-water pilot, will take part in the survey trip of the course. Besides Mr. Wood, Mr. Schiller, and Mr. Strasburg, the pathfinders will include Mr. Sheldon, James Eastman, designer of the flying yacht; Charles E. Planck, publicity director; and three newspaper writers. This preparatory flight is expected to consume approximately ten days.

The 2,700-mi. route proposed for the Great Lakes Air Cruise will take the seaplanes, amphibions, and flying boats entered in the event to many cities and towns in the Great Lakes and Georgian Bay district. The craft are expected to stop at Toledo, Cleveland, Reading, Buffalo, Hamilton, and Toronto; then fly northward across Georgian Bay to Lake Superior and as far west as Duluth.

After leaving Duluth the entrants will fly southward into Lake Michigan stopping at various cities along the western shore line. From Chicago they will follow Lake Michigan's east shoreline northward to the Straits of Mackinac, thence southward along the west shore of Lake Huron to Port Huron, after which they will return to Detroit.

Plan Start August 8

Three things, according to Wayne Sheldon, will determine whether or not a city is selected for a stopping point along the way. First, the city's location; it must be along the general route selected. Second, the city must co-operate with the Detroit Flying Club in arranging for care of the active crews of participating planes. Third, the city must have adequate harbor facilities for accommodating a fleet of planes such as is expected to take part in the event. Population of a city, he said, will in no way determine its selection.

According to present plans, the machines will take-off from Detroit on August 8 and finish here Aug. 17, during which time, experience has shown, the most ideal weather prevails upon the lakes.

Judging by the volume of mail received by the club from cities anxious to be visited and from manufacturers interested in the event the success of the cruise is assured, Mr. Sheldon feels.

Edward J. Hill, president of the Detroit Flying Club and production manager of the Detroit Aircraft Corp., is chairman of the cruise committee.

AERONAUTICAL FINANCE

By R. R. Doane

In Re Mr. Parlin's Prediction

As we are now entering upon the season where prophecies particularly those coming from outside the industry regarding aviation's future seem to be rapidly mounting it might be of interest to augment some of the outstanding forecasts by a rough estimate of the dollar costs of their fulfillment. To be sure most of these prophets admit that adequate capital is an essential accompaniment to such visioned expansion, but few, if any of them have much to say as to the amount needed or how it is to be obtained.

The most recent of these outside prophecies, and one which is being seriously questioned by various organizations within the industry is that of the Division of Commercial Research of the Curtis Publishing Company, conducted under the supervision of C. C. Parlin, which states that within ten years it is entirely probable that the airways of the United States will hum with 250,000 privately owned airplanes, with the total number of planes in such service standing at 1,000,000 by 1945.

That figure is far beyond our wildest hopes. To begin with it would mean a continuation of the previously established high rate of growth of the industry, or an annual increase in production of between 35 and 40 per cent, without regression for the next fifteen years.

It would also mean an increase of approximately 17 times that of the present plant capacity. After taking into account savings derived from large-scale production, increased efficiency, more rapid turn-over of capital, etc., an annual capital augmentation of between 15 and 20 per cent throughout the period would appear essential. On such a basis the periodic new financing may be tabulated as shown in the box, next column.

Such calculation of course assumes the same general stability in the price level of raw materials and of labor as has been maintained during the past seven years with its relative minor fluctuation in the purchasing power of the dollar. Thus such an average annual increase in plant equipment, raw materials, and working capital essential to supplying the annual demand here forecast, appears, from the standpoint of our annual fresh supply of capital available to industry, as well within the range of possibility, although it does not now appear that the industry will undertake even a small portion of such a financial program during the current year.

Of course the outstanding qualifying feature of all such expectations or *forestastes* is that of the purchasing position from whence this effective demand is to come. Thus purchasing position, as well as desire of ownership, determines the *effective* demand. All of which are conditioned by age, health, ability to purchase, as well as willingness, which is no insignificant item.

If we accept this method of calculation and include in aviation's potential market all those with incomes of $10,000 and over as being eligible to purchase and maintain a plane then we find the ratio of private planes now in use to be about one to every one-hundred-and-ten who can afford to buy one. The rate of increase of this income class has been about 7.5 per cent per annum during the past twelve years, or from 169,606 in 1918 to 375,456 in 1928 the latest authentic estimate. Should this number increase at this same rate during the next fifteen years this class would then stand at about 1,400,000.

Five Year Periods	Totals for Periods	Average Amounts per Year
Period ending Dec. 31, 1934	$500,000,000	$100,000,000
Period ending Dec. 31, 1939	1,000,000,000	200,000,000
Period ending Dec. 31, 1944	2,000,000,000	400,000,000

With production increases permitting large unit cost reductions which will be passed along largely to the consumer we may be justified in including the $5,000 income class. With the addition of this latter class the figure now stands at about 950,000 and at the same rate of increase will approximate 2,750,000 by 1945. With the elimination of fully 40 per cent of this figure for considerations of health and age the maximum potential should then stand at around 1,650,000. Should one half of this number become "sold" on the uses of the plane then 825,000 of Mr. Parlin's million are easily accounted for. With the additional owners coming from among the thousands of corporations and individual business enterprises, exclusive of the regular transport lines, also the many flying clubs then in existence, the numerous municipalities and county school districts, the total of one million planes becomes a possibility.

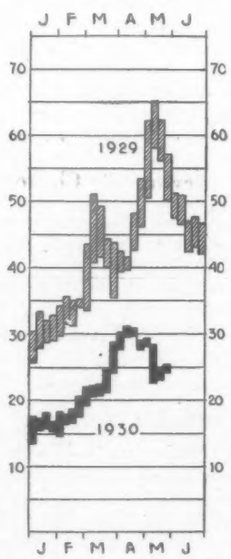
However, it must be remembered that all such assumptions are predicated upon the premise that wealth accumulation in America is to go forward without interruption for the next fifteen years at the same undiminished rate as it has during the past decade. True there are many astute observers who seriously predict an almost total abolition of poverty in America during this period, and from such a point of view we will all be so rich by 1945 that almost any socio-economic prediction, originating from such a base, becomes a rational possibility.

However it is well to call to mind that comparisons of this industry with the experience of others is difficult, due largely to the revolutionary character of its product and of the element in which and with which it works. Also comparisons within the industry of its own recent productive experience are apt to prove equally hazardous for purposes of long-range planning. Thus such analogies are often apt to break down before becoming useful.

By way of illustration it may be observed that the use of the motor car did expand from 8,000 cars in 1900 to 1,625,000 cars at the beginning of 1915, or almost 20,000 per cent increase over this 15-year period. Yet motor car production over the same period increased only about 10,000 per cent. (From 5,000 annual production in 1900 to 500,000 production in 1914.)

Whereas for aircraft an increase from 10,000 planes in use in 1930 to 1,000,000 planes by 1945 would mean an increase of only 10,000 per cent over a 15-year period, but with a production increase of private planes of almost 20,000 per cent. This is just the reverse of the motor car experience and means a vast speeding up of plant production. As we stated before, Mr. Parlin's prophecy

AVIATION STOCK AVERAGES
1930-1929 Weekly Comparisons
(January-June)



The above averages consist of an unweighted weekly price-range of eight representative aircraft stocks covering the entire period from January, 1929, to June 1, 1930. The stocks are The Aviation Corp., Curtiss-Wright, United Aircraft and Transport, Detroit Aircraft, Fokker, National Air Transport, Transcontinental Air Transport, and Aviation Corporation of America.

exceeds our wildest dreams, and even now we refrain from permitting our hopes to mount that high.

The average life of a motor car at present being approximately five times that of the plane it has enjoyed the qualities of an ever successive penetration into the lower and lower income stratum while still more or less economically rendering service on its way down from second to fourth and fifth-hand users. This element has permitted an astonishing number of motors in constant use as the higher income groups have periodically absorbed the newer models.

In other words, due to the present short life of planes, in order to maintain the nation's supply in equal ratio with an even progression of new users an accelerated production becomes essential. This element will undoubtedly be corrected as time and experience permit, but as long as it is present it will surely have its effect upon the annual rate of increase of both sides of the supply and demand equation.

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Aviation Stock Averages

The aviation stock averages have shown a tendency to strengthen somewhat during the past two weeks, with the normal volume of trading maintained, although they are still considerably below their high point reached during the middle of April. This temporary relaxation may be defined as due primarily to the general apathetic condition of the entire securities market rather than to any reversal of conditions within the aircraft industry itself. (See graph on last page.)

Among the current liabilities listed were accounts payable $177,912, accrued taxes, payrolls etc., $117,826, and various reserves totaling approximately $92,000. Surplus as of Dec. 31, 1929 was $6,255,402.

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Irving Air Chute

As of Jan. 1, 1930, Irving Air Chute reports $893,830 current assets against $103,759 current liabilities, or net working capital of $790,071. Net earnings for the year ended Dec. 31, 1929, were $452,672, equivalent to $2.15 a share, as compared with $414,376, or $2.07 a shares of T.A.T. stock.

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Adds To Holdings

North American Aviation Corp. reports having purchased over 25,000 shares of T.A.T. stock.

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Fokker Aircraft Report

The Fokker Aircraft Corporation of America, and subsidiaries, affiliated with General Motors Corp., report for 1929 net profit of $403,938 after depreciation, Federal taxes and charges. This is equivalent after preferred dividend requirements to earnings of 37 cents a share on the 956,000 common shares outstanding at the end of the year.

The consolidated balance sheet of the company as of Dec. 31, 1929, showed in assets, cash and call loans $4,642,334, marketable securities $1,730,355, notes and accounts receivable $626,524, inventories $2,188,508, other current assets $90,490, real estate, plant and equipment $1,741,846. Investments in other companies, good-will, license rights, patents and deferred charges brought total assets to $12,373,779.

Plane for Each State in This Tour

OKLAHOMA CITY (OKLA.)—A national air tour with 48 planes—one plane for each state—and with governors and other state representatives making up the passenger list!

Plans for such an endeavor under the sponsorship of the Oklahoma State Chamber of Commerce are announced by W. B. Estes, of the Oklahoma Chamber, who has conferred with members of both houses of Congress and finds a general willingness for the proposed trip.

Other state chambers, according to Mr. Estes, will be called upon to cooperate the Oklahoma body. The tour, he states further, might well be run this Fall.

New Navy Bomber Tested

PHILADELPHIA (PA.)—A plane known as the "Diving Bomber" has been turned out at the Naval Aircraft Factory here and undergone tests at the hands of Chief Pilot Jack Reber. Reports state it is the first of six such craft planned for manufacture here. The machine is a staggered biplane powered with a Wright Cyclone. Two stationary machine guns mounted on the top wing are controlled through a special telescopic sight in the front cockpit, while the gunner in the rear cockpit also has two machine guns at his disposal. Radio antennæ are located on the right hand side of the craft between the wings.

Report Sale of 22 Planes

LOS ANGELES (CALIF.)—The Aero Brokerage Service Co., with headquarters at the Los Angeles Metropolitan Airport, announces the sale of 22 planes during the past nine weeks. The company, which was organized in 1928, sells new and used aircraft.

Aero Chamber Drafts Modifications in By-Laws

NEW YORK (N. Y.)—An announcement is made of the resignation policy adopted by the Board of Governors at its recent annual meeting. The provision, proffered by the membership committee, is as follows:

"The membership committee recommends that the Board of Governors adopt as a policy that hereafter no resignation shall be accepted unless the member seeking to resign shall first have paid all dues and assessments or other financial obligations for the year in which the resignation is submitted."

To care for the increase allowed in the number of members of the Aeronautical Chamber of Commerce executive committee, the following changes have been made in the by-laws:

ARTICLE VI

Section 1. First paragraph, second line, substitute "five (5)" for "three (3)."

Section 2. Second line, substitute "seven (7)" for "five (5)."

In accordance with action taken at the adjourned annual meeting of A.C.C. members, Article IV, Sections 1 and 2 were amended to read as follows:

ARTICLE IV

Section 1. Board of Governors: Number and Qualification: The affairs of this corporation shall be managed and controlled by a board of twenty-seven (27) directors (hereinafter called "Governors"), of whom sixteen (16) shall be Class A Organization Members, eight (8) shall be Class B Organization Members, one (1) shall be a Class C Organization Member, one (1) shall be an Associate Member and one (1) shall be a Sustaining Member.

Section 2. Board of Governors: Election and Term: At each annual meeting, the several Governors shall be elected by vote of a majority of such of the members of their own respective classes or divisions as shall be present in person or by proxy. The Governors so elected shall constitute the Board of Governors for the ensuing year and until their respective successors are elected.

Open Chicago D.A.C. Showroom

CHICAGO (ILL.)—G. T. Baker is president of the Associated Aircraft Corp., 5051 Broadway, which has just opened an airplane showroom where all types of Detroit Aircraft Corp. planes will be exhibited. The firm was recently appointed D.A.C. distributor for Indiana, Illinois, and Florida and will shortly appoint dealers in those states. Demonstration models are to be housed at the Curtiss-Chicago Airport; while the company will organize a separate staff to aid in glider promotion.

Northwest Aero Show Will Run from June 2-9

ST. PAUL (MINN.)—The Northwest Aircraft Exposition opening here on June 2 under the management of Ray Krimm is expected to have on display more than twenty planes and gliders. Herbert D. Putnam, of the Schlee-Brock Aircraft Corp., is technical director of the show, which will run until June 7.

Special entertainment features arranged for the occasion include provisions for dancing every night to the music of a ten-piece orchestra. The exposition is also to have its own "theme song."

Among those listed on the general show committee are: Mark Hurd, president, Great Northern Aviation Corp., St. Paul; C. T. Schramm, Universal Airlines, Inc., Minneapolis; Francis J. Geng, airport master, St. Paul Municipal Airport; Clarence T. Lowell, vice-president, Minneapolis Chapter, National Aeronautic Association; Eugene S. Shank, president, Shank Flying Service, Robbinsdale, Minn.; Daniel Kiser, Curtiss-Wright Flying Service, Inc., Milwaukee; Paul M. Cole, Bellanca Aircraft Corp., St. Paul; Ernest R. Berg, pilot of proposed American-Scandinavian Trans-Atlantic Flight, Minneapolis; Farr Nutter, Central Air Terminal, Chicago; Francis J. Ditter, Federal Aircraft Co., Minneapolis; Norman G. Warsinske, managing director, Aviation Country Club, Minneapolis; Loye W. Chandler, president, Minnesota Eaglerock Sales Co., Minneapolis; R. R. West, aviation representative, Standard Oil Co., Minneapolis; Lynn C. Jones, aviation representative, Vacuum Oil Co., Minneapolis; H. E. Polsfuss, district distributor, Kendall Refining Company, Minneapolis.

Exhibitors Named

Exhibitors include States Distributing Corp., Minneapolis, aircraft luggage; William H. Ziegler Co., Minneapolis, airport construction equipment; Midwest Oil Co., Minneapolis, gasoline and oils; Minnesota Eaglerock Sales Co., Minneapolis, Eaglerock plane; Roycraft Co., Minneapolis, Graf Zeppelin radio display; Driggs Manufacturing Co., Lansing, Mich., Driggs Skylark; Shank Flying Service, Robbinsdale, Minn., Swallow; Curtiss-Wright Flying Service, Milwaukee, Wis., two Curtiss planes; Great Northern Aviation Corp., Monocoupe, Command-Aire, and Eaglerock; Farr Nutter, Minneapolis; Great Lakes Aircraft Corp., Cleveland, O., Great Lakes Trainer; American Aeronautical Corp., New York, N. Y., Savoia-Marchetti S-56, Kari-Keen Aircraft, Inc., Sioux City, Iowa, Kari-Keen monoplane; Aeronautics Branch, U. S. Department of Commerce, Washington, D. C.; George Pharmer, Robbinsdale, Minn., Heath monoplane; George Gere, St. Paul, experimental biplane; The Texas Co., Minneapolis, gasoline and oils; A. G. Spalding & Bros., Minneapolis, aviation equipment; U. S. Army Air Corps., Washington, D. C., aviation motion pictures; Federal Aircraft Works, Minneapolis, ski display; Parks Air College, Parks Airport, East St. Louis, Ill., aviation school; Davis Aircraft Corp., Richmond, Ind., Davis monoplane; Aviation Sales & Service, Minneapolis, aviation equipment and Aeronca monoplane; Minnetonka Boat Works, Inc., Wayzata, Minn.; W. H. Barber Co., Minneapolis, gasoline and oils; Ernest R. Berg, Minneapolis, Northwest Cadillac Corp., Minneapolis; Auburn Minnesota Co., Cord Corporation; Aviation Country Club, Minneapolis; St. Paul Aviation Club, St. Paul; Freeman-Gross Engraving Co., Minneapolis, official photographers; Haley Sign Co., Minneapolis, aircraft lettering; E. M. Kuhn, Minneapolis, Owen Richardson, St. Paul, Butler Manufacturing Co., Minneapolis, hangars; Conrad Flying Service, Inc., Winona, Minn., Spartan biplane; Murphy Transfer Co., St. Paul, aircraft hauling; Nicholas-Beazley Airplane Co., Marshall, Mo., Barling NB-3; Nicols, Dean & Gregg, St. Paul, aviation accessories; American Telephone & Telegraph, St. Paul-Minneapolis, teletype machine; Reinhard Bros., Minneapolis, aircraft accessories.

Germans Tour With Exhibit

NEW YORK (N. Y.)—An exhibit of two airplanes, a water glider and some sixty plane, seaplane, and glider models are now being taken on a tour of the country under the direction of Baron Koenig von Warthausen and Antonie Strassman, German fliers.

The collection was displayed here for a week at Gimbel Brothers. This department store, which for some time has been identified with the formation of boys' model clubs, with a group in this city several thousand strong, is sponsoring the display, which will be carried to other Gimbel stores such as those in Philadelphia and Milwaukee. The three craft are a Klemm Daimler, presented to the Baron in recognition of his globe-circling flight last year, an Aeromarine Klemm, and an American Motorless Aviation Corp. water glider. The model craft include a special large-sized Do.X constructed at the Dornier plant.

Army Planes in More Maneuvers

WASHINGTON (D. C.)—For the third time within two months, extensive Army Air Corps maneuvers are being staged, this time in the vicinity of Groton, Conn., May 24 and 28. These exercises will take place in connection with the Minor Joint Army-Navy Demonstrations and will involve various problems relevant to the defense of Long Island Sound against a Naval attack. Scheduled to take part in the "battle" are 18 pursuit and two transport craft from Selfridge Field, Mich.; nine bombardment planes from Langley Field, Va.; and an observation squadron of approximately thirteen machines from Mitchel Field.

Begin Twenty 40-B-4 Order

SEATTLE (WASH.)—Work has started in the Boeing airplane factory on an order of twenty 40-B-4, Hornet-powered planes for mail service, to cost approximately $500,000. Reports state there are now 850 men employed in the plant.

Postpone Curtiss Marine Race

ANACOSTIA (D. C.)—Although the weather initially appeared promising, a sudden storm approaching the intensity of a gale brought postponement here, May 24, of the eleventh annual Curtiss Marine Trophy Race, Saturday May 31 being designated the new date. Navy fighters, bombers, scouting, and torpedo planes numbering well over one hundred were just completing the formation flight over the city which was to open the classic when the high wind and rain bore down on Anacostia to necessitate quick landing of the planes and a scurry for shelter of the several thousand spectators gathered for the event. All but one of the Navy planes was landed and staked down without incident, the exception being a fighting plane which was damaged when caught by a twist of the wind as it was about to land. The pilot was unhurt.

The Goodyear dirigible "Vigilant" was forced to remain in the air for several hours after the storm abated. The "Vigilant" was the only dirigible on hand, the "Los Angeles" having been kept at her base at Lakehurst.

Form Aerial Police Squad

ROBBINSDALE (MINN.)—The council of this city has approved the adoption of an aerial police patrol through an agreement with the Shank Flying Service, operating a private field 4.9 mi. north of the Minneapolis business district. The three pilots, Gene Shank, Harry Hembre, and Harry Holcolb will alternate in patroling an area of 50 sq.mi. between Robbinsdale, Crystal Lake, and Oakdale. Eight flights will be made per day in Swallow planes on the lookout for fugitives of the law, fires, those needy of help on the nearby lakes, etc. Each of the members of the Aerial Police Patrol have been sworn in as deputies under a $500 bond and will wear uniforms somewhat similar to the natty ones used by the state highway motor patrol. The planes will bear special insignia. A Lockheed Vega will be available for official functions.

Plan Sixteen Iowa Tour Stops

DES MOINES (IOWA)—Sixteen stops are planned for planes in the forthcoming Iowa air tour and will include the following cities: Centerville, Burlington, Davenport, DeWitt, Iowa City, Ottumwa, Charles City, Algona, Estherville, Emmetsburg, Sioux City, Atlantic, Creston, and Marengo. The flight will start from here on June 16 and end here the following Saturday or Sunday, according to George Yates, chairman of the tour committee.

Start Douglas Plant Addition

SANTA MONICA (CALIF.)—Douglas Aircraft Co. is starting construction on a steel and concrete addition to their Clover Field airplane factory.

Goodyear-Zeppelin Trains Airship Pilots

AKRON (OHIO)—A course intended to develop the navigation ability of the airship pilot to the greatest possible degree is being offered in the ground school of the Goodyear-Zeppelin Corp. The two features emphasized are the physical skill necessary to keep an airship pointed in the proper direction, and the mental ability to determine with speed and accurateness and under all conditions just what the proper direction is, Ward T. Van Orman, well-known balloonist and air navigator, is in charge of the school.

The course makes use of three books—"The American Nautical Almanac for 1930," "Dreisonstok's Tables, Hydrographic Office No. 208," and "Navigation of Aircraft," by Logan C. Ramsey. Each student needs in addition a pair of 6-in. dividers, a 12-in. rule graduated to in., a celluloid protractor, and a watch with a constant rate of gain or loss not exceeding 10 sec. per day.

Navigation Study Stressed

As a preparatory measure for the course in celestial navigation, students are required to review previous courses in navigation with emphasis on dead reckoning and plotting, methods of determining wind effect, effect of wind on dead reckoning, determining the wind, plotting and dead reckoning problems, interception problems, and a thorough study of plotting.

Although apparently difficult, the course can be readily mastered by almost anyone Van Orman declares. The basis of all such navigation is time, and students are urged to make a most careful study of the subject. Different phases include apparent solar time, mean time, the equation of time, sideral time, time at different meridians, Greenwich time, the conversion of mean solar to sideral time, the conversion of mean into apparent time, and the reverse, determining the hour angle of a body from the time, and the reverse.

Students are urged to familiarize themselves with the nautical mile of 6,080.27 ft., which is used instead of the statute mile of 5,280 ft.

How Classroom Work Is Divided

An interesting part of the course consists of a study of the radio compass as used in aerial navigation, actual demonstrations of radio compass flying being given. Receiving equipment available enables students to use broadcasting stations for radio compass work. A thorough discussion and demonstration of the use of airway stations, both for radio range and radio compass work, is included.

The course totals 61.5 hr. of classroom work, divided as follows: Dead reckoning, 20 hr.; lighthouses, 5 hr.; radio compass, 4 hr.; time, 1 hr.; latitude problems, 5 hr.; longitude problems, 5 hr.; polaris, 1 hr.; moon, 1 hr.; sun, 3 hr.; planets, 1 hr.; star identification, 2 hr.; H. O. 203, 5 hr.; Dreisonstok, 5 hr.; Pierce, 2 hr.; Weems star charts, 1 hr.; and sextant practice, 5 hr.

Instruction flights include one navigation flight, two interception trips, one latitude flight by celestial navigation, one longitude flight by celestial navigation, one fixed by celestial navigation, one radio compass flight, and an examination flight.

This course has been found particularly adapted to the producing of capable airship pilots, according to the experience of the firm, states Goodyear-Zeppelin.

Mears Plans World Hop in Vega

NEW YORK (N. Y.)—A Wasp-powered Lockheed Vega equipped with a special Pioneer instrument board will be used by John Henry Mears in his forthcoming attempt to lower the present round-the-world record of 21 days 8 hr. 26 min., established last Autumn by the Graf Zeppelin. Fred Melchior, is to pilot Mr. Mears on his 19,000-mi. trip, the first leg of which will be from here to Harbor Grace, Newfoundland, where the plane will be refueled before taking off for Valencia, Ireland. Their route will take them across Siberia, the Kamchatka Peninsula, the North Pacific, Aleutian Islands, Seward, Alaska; Seattle and back to this city. The Vega, christened the "City of New York," has five wing and two fuselage fuel tanks capable of holding 450 gal. of gasoline. A long range radio transmission set will be carried.

Pontooned Aeronca Soon Ready

CINCINNATI (OHIO)—The first pontooned Aeronca will be tested out on the Ohio River sometime within the next few weeks, states a release from the Aeronautical Corporation of America. J. J. Reilly is now superintendent of the factory. Paul DuBois, Syracuse, has replaced Charles Dallas as representative in that district.

Air Congress to Get Aero Branch Reports

WASHINGTON (D. C.)—An invitation to participate in the Fifth International Air Congress, to be held at The Hague, Holland, September 1-6, has been received by the Aeronautics Branch. As a result, that department will submit four papers to the Congress, which is sponsored by The Netherlands government.

Col. Clarence M. Young has announced the following articles will be presented:

Report of Liaison Committee on Aeronautic Radio Research, organized by the Aeronautics Branch in January, 1930, and composed of representatives of the Army, Navy, and Commerce Departments; the National Advisory Committee for Aeronautics, Aeronautical Chamber of Commerce, American Air Transport Association, Radio Manufacturers' Association, Institute of Radio Engineers, and National Electrical Manufacturers' Association;

Report of the Fact-Finding Committee organized to determine the effectiveness of the automatic application of water in controlling airplane hangar fires;

Congress in Five Sections

Report on Uniform Field Rules for Airports, which subject has been the basis of a study by a special committee organized by the Aeronautics Branch;

Paper on American Airway Practices, which will describe the development, growth, present status, and method of operation of the American airways.

The Congress will be divided into five main sections dealing with the following subjects: Aerial traffic, Service and Technics, Legal Questions, Medical Questions, and Aerial Tourism.

The forthcoming convention will be the fifth to be held since the war, the first having taken place in Paris, 1921; the second in London, 1923; the third in Brussels, 1925; and the fourth in Rome, 1927.

"QUOTES"

Relegation of the Mails. "The Government's ultimate objective is to develop a nation-wide network of passenger and express airlines, upon which the transportation of the mails will perhaps be only an incidental operation."—POSTMASTER GENERAL BROWN.

The Do.X Judged? "The airplane is tragically unsuited for ocean service."—DR. HUGO ECKENER.

Yes, It Was Striking. "The huge transport planes filling the main exhibition floor (of the New York Air Show) have a note of obvious strength, solidity, and importance about them which makes vivid, in a way that no amount of statistics or description could achieve, the strength and importance of the new business of flight."—NEW YORK *Herald Tribune.*

Speed vs. Resistance. "Speed is of primary importance in competition between airliners, yet about 30 per cent of available engine power is used to overcome resistance which could be eliminated."—GEORGE J. MEADE, Pratt & Whitney Aircraft Co.

Extra Fare. "Since fares were brought within the limits of the traveling man's expense account, the airlines have been carrying large numbers of salesmen and other business representatives. There exists a class of persons who are willing to pay higher fares for additional comfort in airplane travel, just as there is a class of railroad travelers preferring extra fare train comforts."—WILLIAM B. MAYO, chief engineer, Ford Motor Co.

PERSONNEL

CAPT. ADRIAN I. KEEGAN, former special representative of the president of the Brooklyn (N. Y.) Chamber of Commerce, is now vice-president and business manager of International Airports Corp., New York City, and has been made a director.

ROY M. DAY has been appointed manager and chief pilot of the Marion (Ohio) municipal airport, succeeding William A. Butters, who is now at Johnstown, Pa.

CLIFFORD MUTCHLER, recently general manager of West Coast Air Transport. has been appointed superintendent of operations for Western Air Express, with headquarters at Los Angeles. J. H. WHITE has been promoted to the position of general manager of West Coast Air Transport.

C. J. LUCAS is now sales manager of Curtiss-Wright Flying Service for Oklahoma, with headquarters in Tulsa.

V. L. BOLIN has been appointed divisional traffic manager for S.A.T. Division of American Airways, with his office in San Antonio, Tex.

MAJ. R. E. NICOLL, who has been District Superintendent of Western Flying Operations in the Ontario Provincal Air Service for the past two years, is now with Aircraft Slotted Wing Corp., Ltd., Canadian licensees for Handley Page slotted wing patents.

C. E. JOHNSON has been made operations manager for Pacific Air Transport Co., Portland, Ore.

MISS RUTH ALEXANDER has been made chief instructor for Pacific Coast Gliders, Inc., Lindbergh Field, San Diego, Calif., until Jack Barstow returns to duty. She will then be assistant instructor.

ALBERT DORRIS has been appointed publicity director for western division of T.A.T.-Maddux Lines, with headquarters in Los Angeles.

LIEUT. ROY W. CAMBLIN succeeds LIEUT. E. E. GLENN as commandant at Hatbox Field, Muskogee, Okla.

GLENN E. MESSER has resigned as vice-president and general manager of Southern Aircraft Corp., Birmingham, Ala., and severed his connection with Messer Field.

MARTIN JENSEN is now head of the aeronautical division of Beckley College, Harrisburg, Pa.

GEORGE R. SMITH, formerly Curtiss-Wright Flying Service manager at Camden, N. J., is now sales manager of Wings Corp., of Philadelphia, with headquarters at Central Airport, Camden.

Ross E. WATSON has been appointed Los Angeles traffic manager for Continental Air Express.

CAPT. LEWIS E. GOSS, recently division superintendent at Denver, has been appointed superintendent in charge of all operations on the Los Angeles-Kansas City route of Western Air Express. LESLIE FRAZEUR has been promoted to the position of assistant division superintendent at Denver, and HENRY L. CATTS has been appointed assistant to the purchasing agent at Los Angeles.

CAPT. WILLIAM B. WRIGHT, JR., succeeds LIEUT. ISAIAH DAVIES as commanding officer and instructor of the Air Corps reserve at Richards Field, Kansas City, Mo.

ERNEST S. HENSLEY has been made operations manager of the Palm Park airport at South Jacksonville, Fla., controlled by McMullen Aircraft Co.

GEORGE GARDNER, supervising inspector for the Aeronautics Branch in the New York area, has been promoted to an inspectorship of airlines. He is succeeded by S. R. WILLETTS.

DR. WELTON J. CROOK has been engaged as consulting metallurgist for Axelson Aircraft Engine Co., Los Angeles.

W. L. LEWIS, designer of the Solar plane, has resigned his position as chief engineer of Solar Aircraft Co., San Diego, Calif.

F. HOUGH has been added to the staff of Department of Commerce inspectors at Detroit, bringing the number of inspectors there to six.

WINSOR WILLIAMS, manager of American Air Transport Association, has been appointed a member of the Chicago Aero Commission.

MISS JANE WILLIS is now demonstration pilot for Curtiss-Wright Flying Service at Denver, Colo., and will become a sales pilot when she receives her limited commercial license.

New Firms Announced

SECURITY AIRWAYS, INC., Guilford, Conn.; capital, $50,000; by Elizabeth, Mellessa and Ruth L. Meadowcroft; to operate charter services.

OMAHA FLYING CLUB, Omaha, Neb.; capital, $25,000; by Chester E. Beck, F. Jerome Lewis, and William S. Poppleton.

SOO SKYWAYS AIRPORT CO., Sioux Falls, S. D.; capital, $200,000; by R. A. Brown, J. M. Foster, C. H. Peck, S. A. Burke, W. Z. Sharp, I. A. Moore, and Knapp Brown; to operate an airport and flying school, to sell planes, and to conduct a transport service.

ALLEN-COX, INC., Terre Haute, Ind.; Paul S. Cox, president, Bernard Allen, vice-president, Thomas Jackson, secretary and treasurer; to sell airplanes.

AIRCRAFT SALES AND SERVICE CORP., Milwaukee, Wis.; capital, $25,000; by M. R. Morrissey, M. Madden, and W. F. Loebe; to operate and deal in airplanes.

MARINE MOTORS, INC., The Bronx, New York City; capital, $20,000; by Rudolph Klages, Chester S. Bagg, John T. Hancock; Peck & Hancock, 26 Liberty St., New York City, attorneys; to deal in engines for aircraft and boats.

NATIONAL AVIATION INDUSTRIES, LTD., Los Angeles; capital, $25,000; by J. H. Thomas, M. J. Fix, and C. M. Dustin.

AERONAUTICAL CALENDAR

May 30-June 8	Pennsylvania Goodwill Air Tour, sponsored by Aero Clubs of Philadelphia and Pittsburgh.
June 10	National Elimination Balloon Race Houston, Tex.
June 8-15	Annual F.A.I. Conference, Paris.
June 16-21	Second Annual Indiana Air Tour.
June 23-29	Second all-Nebraska Air Tour.
June 28	Annual R.A.F. Display, Hendon, Eng.
July 20-Aug. 7	International Light Plane Tour, starting from Tempelhof Airport, Berlin, Germany.
July 21	All-America Flying Derby, starting from Detroit, Mich. Sponsored by American Cirrus Engines, Inc., Marysville, Mich.
Aug. 9-24	International Gliding Meet, auspices Rhoen-Rossiten Gesellschaft; the Wasserkuppe, East Prussia, Germany.
Aug. 23-Sept. 1	National Air Races, Chicago, Ill.
Sept. 1	Gordon Bennett International Balloon Race, Cleveland, Ohio

EXPOSITIONS

June 2-7	Northwest Aircraft Exposition, the Coliseum, Minneapolis-St. Paul, Minn. Show Director, Ray Krimm, 601 Wesley Temple Bldg., Minneapolis.
June 28-July 6	Pacific Coast Aeronautical Exposition, Oakland, Calif., Municipal Airport.
July 6	International Transportation Exposition, Warsaw, Poland.
Sept. 6-8	International Aero Exhibition, Stockholm, Sweden.

MEETINGS AND CONFERENCES

June 9-12	Semi-annual meeting, A.S.M.E., Detroit, Mich.
July 3-5	Western States Aeronautical Conference, Medford, Ore.
Aug. 26-28	S.A.E. Aeronautic Meeting, Chicago, Ill.
Sept. 1-6	Fifth International Air Congress, under the auspices of the Royal Aero Club; The Hague, Holland.

AIRPORT DEDICATIONS

May 30-June 1	Dedication and Air Circus, Colusa, Calif., Municipal Airport.
May 30-June 1	Dedication and Air Meet, Bowles Airport, Springfield, Mass.
May 30-June 1	United Airport, Burbank, Calif.
May 29-31	Abilene, Tex., Municipal Airport.
June 2-3	Clarksville, Tenn.
June 6	Hutchinson, Kan.
June 7-8	Los Angeles Airport, Los Angeles, Calif.
June 10	Elgin, Ill., Municipal Airport.
June 18	Dedication and meet, Dickinson, N.D.
June 20-21	Randolph Field, San Antonio, Tex.
June 21-22	Allentown, Pa., Airport.
June 28-29	Tyler, Tex., Municipal Airport.
July 4	Kelso, Wash., Airport.
July 4	Curtiss-Wright Airport, Milwaukee, Wis.
July 4-5	Harrisburg, Pa.
Aug. 1-2	McGhee Tyson Airport, Knoxville, Tenn.
Aug. 30-Sept. 1	Williamson Johnson Airport, Duluth, Minn.

BRIEFLY

Airplanes are being used extensively to extend the range of campaign activities by all three of the leading candidates for the Governorship of the state of California.

Pilot employees of Fairchild Airplane Manufacturing Co., Farmingdale, L. I., N. Y., are offered the use of a KR-21 plane by the company, paying only for fuel and insurance.

It has been ruled that airplanes in Texas are exempt both from the state gasoline tax and the state vehicle tax, since they do not use highways.

Walter F. Halley, president, and other officers of Rapid Air Lines Corp., Omaha, Neb., were re-elected at a recent meeting.

Brubaker Air-Photos, Portland, Ore., is to photograph the entire Willamette Valley and all of southern Oregon.

Officials of Sikorsky Aviation Corp. and Stearman Aircraft Corp. were guests of the United States Military Academy, West Point, N. Y., May 17.

The technical committee of United Aircraft & Transport Corp. made a tour of inspection of the Sikorsky factory, Bridgeport, Conn., May 20.

The Forestry Department will develop emergency landing areas in the forest regions of the northwest for the use of forest patrol planes.

All aviation activities of the Portland, Ore., chamber of commerce have been turned over to the junior chamber of commerce which was formed recently.

Van Lear Black arrived in Baltimore May 17, after flying from San Francisco, completing a trip eastward around the world which began with a flight from Croydon Airport, London, Feb. 9.

N. L. Mallison and W. F. Barnwell won the main contests in a glider meet held at Fernandina, Fla., May 17.

At the end of 1929, there were 22 light plane clubs in Canada engaged in giving flight instruction. The total membership was 4,840.

Eastern Engineering representatives of Arrow Aircraft & Motors Corp. have been testing an Arrow sport powered with a Genet 88 hp. engine at Roosevelt Field.

Prine Aeromotive Sales & Service Co. has established a sales and service station at Fairfax Airport, Kansas City.

Flying Club of Baltimore, Md., is holding its tenth annual aircraft exhibit at Logan Field May 30-June 1. National Guard and other races, and demonstrations by Curtiss-Wright Exhibition Co. are on the program.

Hon. David S. Ingalls, Assistant Secretary of the Navy for Aeronautics, addressed the graduating class at the U. S. Naval Academy at Annapolis May 23.

The new Lockheed plane in which Lieut. Harold Bromley had hoped to fly from Tacoma to Tokio crashed during a test flight and was completely burned.

Devise Finance Plan For Whittelsey Avians

BRIDGEPORT (CONN.)—Through an agreement with the Bankers-Commercial Security Company, Inc., the Whittlesey Manufacturing Company, Inc., now offers the Avian on a retail financing basis.

Under this proposition, the final cost is the sales price of the machine delivered to the consumer for cash (including delivery or handling charges), plus 6 per cent for insurance, plus 5½ per cent finance charges on the unpaid balance remaining after the first payment.

Insurance: The insurance covers a period of eight (8) months, although the finance plan only runs for six (6) months and is a reducing form, in that it insures the plane in favor of the distributor or dealer or the finance company up to the value of the unpaid balance from time to time.

This 6 per cent is an estimate average in the proposal which provides that should the insurance be a higher premium, the purchaser is to immediately pay it, and if a lower premium, he is to be credited on the final installment.

First Payment: The total price to the consumer, plus the insurance is divided by three and this figure becomes the first payment by the purchaser.

Installments: This would leave two-thirds of the sum of the total price and the insurance as the unpaid balance. To this add 5½ per cent for finance charges, divide the result by six, for six monthly installments, and you arrive at the amount of each monthly payment.

Working Figures: The following are the working figures for the Whittlesey Avian, with and without Handley Page slots, delivered at some point where there would be $55 delivery and handling charge:

	Without Slots	With Slots
Factory list price	$3,845.00	$4,295.00
Distributors delivery charge	55.00	55.00
	$3,900.00	$4,350.00
Insurance—6 per cent	234.00	261.00
Total	$4,134.00	$4,611.00
Divided by three makes Your first payment	$1,378.00	$1,537.00
Total minus first payment gives balance of	$2,756.00	$3,074.00
Finance charge—5½ per cent	151.58	169.07
Unpaid balance	$2,907.58	$3,243.07
Divided by six calls for monthly installments of	484.60	540.51

Repossession: In the event the purchaser failed to meet the installments and it was impossible to collect from him, then the only recourse would be for the finance company to repossess the plane, as is the case in similar instances with the automobile, radio, etc.

In this situation on the six-months plan the dealer or distributor should be safe, in that the unpaid balance should be less than the real value for which the plane could be reasonably sold.

The finance company could thus obtain the full amount of their unpaid balance. the dealer or distributor would receive the 10 per cent held back on him, and there would probably be a balance that would go to the purchaser.

SCHOOLS

MIDWESTERN SCHOOL OF GLIDING has been organized at St. Joseph, Mich., and will offer five graded courses between June 30-Sept. 1. The section system of instruction, according to which groups of ten work together, will be used. Ground as well glider training will be given.

COAST AIR LINES, INC., which at present operates flying schools at Seattle and Everett, Wash., is planning to establish a school at the Pierce County Municipal Airport near Tacoma.

FRANK WIGGINS TRADE SCHOOL, Los Angeles, will offer a special summer course in airplane design, starting in June.

HANCOCK FOUNDATION COLLEGE OF AERONAUTICS, Santa Maria, Calif., reports that it now has 55 cadets in regular, full-time attendance. The six-reel film, "Winning His Wings," which depicts the life of cadets at the college is now available for distribution.

STANDARD FLYING SCHOOLS, Los Angeles, will hereafter offer instruction in the theory and practice of gliding. More than 75 students have been enrolled for the first class.

T. C. RYAN FLYING SCHOOL, San Diego, recently organized a cross-country tour in which five transport students flew from San Diego over ocean and mountains to San Francisco.

AIRTECH SCHOOL OF AVIATION, San Diego, has opened a new unit at the Imperial County Airport, Imperial, Calif., with Roy Pemberton as instructor.

Representatives Named

RAPID AIR LINES—George Kranick, Mobridge, S. D.; Magnus and Taylor, Carrington, N. D.

SIKORSKY S-39—Brinton-Bayles Flying Service, Inc., Springfield Airport, Springfield, Mass.

NEW STANDARD—National Airways, Inc., Detroit, for Michigan.

FLEET—Baltimore School of Aeronautics, Baltimore, Md.; Dallin Aerial Surveys, Ludington-Philadelphia Airport, Philadelphia.

STINSON—Everett S. Shipp, pres. of Metropolitan Finance Corp., Los Angeles, with headquarters at the Los Angeles Airport.

SAVOIA-MARCHETTI — Air-Sea-Land Aircraft, Inc., Chicago.

MOTH—H. S. Jones, Municipal Airport, Fort Worth, Tex., distributor for Texas.

EASTMAN—Southwest Air Services, Houston Airport, Houston, Tex., for southern Texas.

BARLING NB-3 — Allen-Cox, Inc., Terre Haute, Ind., for eastern Illinois and western Indiana.

AIRPORTS AND AIRLINES

New Schedule Gives Coast-to-Coast Service

CLEVELAND (OHIO) — The first through coast-to-coast passenger service went into operation May 20 when Pennsylvania Air Lines (formerly Clifford Ball, Inc.) adjusted its Washington-Cleveland passenger schedules to make connections with Pittsburgh Airways at Pittsburgh and with Stout Air Services at Cleveland to offer 34-hr. service between New York and San Francisco and Los Angeles.

It is now possible to leave New York (Newark Airport) at 9:30 a.m. with Pittsburgh Airways, connect at Pittsburgh with the Pennsylvania Air Lines plane, which departed Washington at 12:05 p.m., and arrive in Cleveland at 4 p.m. There the passenger may board a Stout plane, arriving in Chicago via Detroit at 7:20 p.m. At 9 p.m. he now takes a Boeing Air Transport plane from Chicago and, flying via Omaha, Cheyenne, Salt Lake City and Reno, arrive at San Francisco at 4:30 p.m. next day. By transferring to Eastern Air Express at Salt Lake City, he may reach Los Angeles at 5 p.m. the day after leaving New York.

The combined fares from New York to San Francisco are $278, to Los Angeles $248, to Chicago $78. From Washington to these same points the fare is $10 less than the New York rate, and from Baltimore it is $15 less.

Pennsylvania Air Lines replaced its single engined planes with Ford transports between Cleveland and Pittsburgh and added Akron and Youngstown (Ohio) and Greensburg, Pa., as flag stops on this division.

The fare from Washington was reduced to Pittsburgh from $45 to $40, and from Pittsburgh to Cleveland it is now $15 instead of $18. A charge of $5 is made between Baltimore and Washington, while the fare from Pittsburgh to New York is $35, to Chicago $43, to Detroit $25, to Akron $10, to Youngstown $7.50, and to Greensburg $5.

Speed Boats Carry Air Mail

OAKLAND (CALIF.)—Approximately four tons of air mail a week are being handled by the Water Taxi Co., which recently was awarded a contract by Post Office authorities to transport air mail from Oakland Municipal Airport to San Francisco. Two speed boats used in the service make the trip across San Francisco Bay in 30 min. The mail was formerly transported by ferry boat. E. E. Rowland and L. J. Fahy are owners and operators of the speed boat service.

Rail and Air Companies Meet

NEW YORK (N. Y.)—In the interest of plans for close co-operation between certain airlines and railroads by provision of through ticket facilities between this country and points in South America, representatives of these companies were guests of New York, Rio & Buenos Aires Line, Inc., at a dinner and meeting, May 26. The companies included: Pennsylvania Railroad, Seaboard Air Line Railway, Louisville & Nashville Railroad, Richmond, Fredericksburg and Potomac Railroad, T.A.T.-Maddux Air Lines and Nyrba.

Airport Meeting Awarded to Tulsa

TULSA (OKLA.) — This city will be the scene of the third annual National Airport Conference of the Aeronautical Chamber of Commerce next year. St. Paul, Los Angeles and Cincinnati also bid for the event. Charles W. Short, Jr., manager of the Tulsa Municipal Airport and recently named permanent chairman of the South-Central division of the airport section, Aeronautical Chamber of Commerce, presented the Tulsa invitation at the annual conference at Buffalo, May 14-16.

T.A.T.-Maddux Teletype Ready

LOS ANGELES (CALIF.)—Completion of teletype installation at all T.A.T.-Maddux stations in the western division has been announced by H. W. Beck, western division traffic manager. All of these ground stations are also equipped with telephone and telegraph facilities, and all of the company's planes are now equipped with two way radio telephone with a range of several hundred miles between planes and ground stations and a range of about 300 mi. between planes in flight. This combination of teletype, radio, telephone and telegraph makes it possible for any pilot in any plane en route at any point in the western division to get in touch immediately with any department or executive of the western division. All pilots in the air are now required to establish contact with their nearest ground station every fifteen minutes during the duration of the flight.

Airlines Reporting Much Passenger Traffic

NEW YORK (N. Y.)—A total of 117 paying passengers were carried by the Mamer Air Transport in the first week of its operation of a line between Spokane and Seattle, according to the report of Newton Wakefield, traffic manager. The company is operating a plane from Spokane to Seattle each morning and from Seattle to Spokane each evening.

A total of 285 passengers used Southwest Air Fast Express service from St. Louis to cities in Oklahoma and Texas during the first fifteen days of May. The system of interchanging passengers at St. Louis with T.A.T.-Maddux is proving satisfactory, according to M. P. Bickley, St. Louis representative of S.A.F.E.

An increase of 14 per cent in passenger transport in April over the preceding month has been reported by Halsey Dunwoody, executive vice-president of the Universal Division of American Airways, Inc. The comparison of April, 1930, with the same month in 1929 shows a gain of more than 400 per cent in the company's traffic. Scheduled planes flew a total of 157,272 mi., aggregating 1,512 hr., with an average speed of more than 103 m.p.h. during April, 1930. This total represented 532 trips. April's mail poundage increased to 26,180, a gain of 3,072 lb. over March. During April, 1,207 passengers were carried in and out of St. Louis on the company's planes, the largest total having been 763, over the St. Louis-Chicago route.

Colonial Division of American Airways reports it carried 3,675 passengers and flew 102,939 mi. during the first 4 mo. of this year. A total of 266 packages, weighing 940 lb., were carried in co-operation with the Western Union.

Seek Stock Issue for L.A. Port

LOS ANGELES (CALIF.) — Stockholders of Los Angeles Metropolitan Airport will be asked to approve the creation of a $300,000 convertible 7 per cent preferred stock issue to provide capital for additional building and to retire land indebtedness, according to Lloyd L. St. John, president. The company recently levied an assessment on its stock of $1 per share, payable June 5 and delinquent July 1. According to the announcement, operating profits are increasing steadily but the interest on indebtedness on the large land holdings has caused a deficit. Rental income for the first quarter of 1930 jumped to $10,161, as compared with $3,372 for the same period last year.

Prepare Dedication of Los Angeles Airport

LOS ANGELES (CALIF.)—Events in connection with the dedication of Los Angeles Airport, formerly Mines Field, include races for civilian and military pilots, formation flying, dead stick landing and balloon bursting contests, and glider flying. The dedication, starting at 2 p.m. on the afternoon of June 7, with the unveiling of a bronze plaque by Col. Thos. F. Cooke, councilman, will be concluded in the evening with the staging of the second annual Hangar Nite celebration of the Southern California Chapter of the N.A.A.

The construction of the two new hangars in which the Hangar Nite program is to be staged is being rushed to completion in order to be ready by June 1. Other improvements now under way at the airport include the early removal of the line of poles from along the east and west boundaries of the field. The Los Angeles Airport is thought to be the first major airport to build a separate glider runway for primary training. This is now under construction and will be 400x3500 ft. Instruction is being given by the Hastings Autoplane School, using Bowlus Training planes operated under the supervision of Albert E. Hastings. The total glider landings registered for the month of April were 303.

Recent tenants locating at Los Angeles Airport include the International Air Transport Company, operating a Los Angeles Harbor to Ensenada harbor airline using Savoia Marchetti flying boats; and the Slade Hulbert Flying School. Total passengers carried in April were 653 compared with 614 for March, total landings for April were 5,905 compared with 5,932 for March, and total students flown were 827 in April against 767 for March.

Texas League Considers Ports

AUSTIN (TEX.)—A session on municipal airports was one phase of the meeting of the League of Texas Municipalities held in Austin, May 15-16. Paul Jackson, Southwest manager of the Curtiss-Wright Flying Service in Houston, gave a talk on "The Need for More Municipal Airports" in which he discussed their value, and the advantages to be derived by the cities possessing such airports. A general discussion was held after the talk.

Chicago Ramp to Be Built

CHICAGO (ILL.)—A new ramp costing $17,300 is to be built at Grant Park at the foot of 8th Street. This will replace a plank installation there last year which was carried away during storms last season. Permission to build a coffer dam in connection with the new ramp has been granted by the War Department. It is expected that a shuttle service will be operated between the park and the municipal airport as was done last year.

Robertson Changes Route

MEMPHIS (TENN.)—Pine Bluff, Ark., south of Little Rock, has been substituted for the latter as the intermediate stop on Robertson Airplane Service Co.'s line between this city and Hot Springs. Unsafe condition of the Little Rock port at the present time was given as the reason for the change.

Varney Passenger Service Inaugurated

SEATTLE (WASH.) — Varney Air Lines began carrying passengers on its mail routes between Portland, Pasco, Boise and Salt Lake City. Passengers use Pacific Air Transport machines between Portland and Seattle and schedules permit close connections with other passenger services at Salt Lake City. Boeing 40-B-4's are used. These accommodate a large load of mail and about four passengers.

Twice daily service is available. It is expected that Varney will extend this passenger accommodation eventually to other cities served by its mail planes, such as Tacoma and Seattle on that division and Spokane on another division. The schedule is as follows:

Lv. 6:25	**5:20**	Portland	Ar. **7:50**	7:50
Lv. 8:40	8:00	Pasco	Lv. 5:20	5:20
Lv. Noon	11:20	Boise	Lv. 2:20	2:20
Ar. 3:20	2:40	Salt Lake City	Lv. 11	11

Light figures are a.m.; **bold figures are p.m.**

San Antonio-Mexico Passenger Line Starts

SAN ANTONIO (TEX.) — What is known as the Linea Aerea Central Mexicana, S.A., began daily passenger service May 15 between this city and Monterrey, Mexico, with a stop at Nuevo Laredo, on the Texas border. Each trip is made in about 3 hr. and the distance covered is about 300 mi. Bellancas fitted with Whirlwind 300's are being used. The officers include: Carlos Gonzalez Garza, president; Maj. Frederic Lord, vice-president and general manager; Matias Elizondo, treasurer; and B. Lange, Jr., secretary.

The schedule is as follows:

lv. 8 a.m.	San Antonio	arr. 3:30 p.m.
lv. 9:30 a.m.	Nuevo Laredo	lv. 1:45 p.m.
arr. 11 a.m.	Monterrey	lv. 12:30 p.m.

Connections are made here with planes operating on the Southern Air Transport Division of American Airways, Inc.

Cromwell Extends Service

BIG SPRING (TEX.)—Cromwell Airlines, Inc., of San Angelo, Tex., has extended its San Angelo-San Antonio line to Big Spring where connections are made with Standard planes to El Paso. The new schedule is:

lv. 8 a.m.	San Antonio	arr. 4 p.m.
lv. 10 a.m.	San Angelo	lv. 2 p.m.
arr. 11 a.m.	Big Spring	lv. 1 p.m.

Hog Island Purchase Agreement Announced

PHILADELPHIA (PA.)—The terms of the agreement between the city of Philadelphia and the United States government under which the city is to acquire Hog Island for a huge air-rail-marine terminal reveal that for $450,000 the city will obtain an interest in the property constituting a virtual joint ownership with the government. Under the agreement the city will pay the $450,000 immediately, which is really the sale price, as the $2,550,000 balance of the much discussed $3,000,000 price reported during the negotiations represents a capital value on the property which the city need never pay, since it will be legally retained by the Federal Government.

The government reserves a perpetual ground rent which is to run for 10 yr. on the basis of 3 per cent of the $2,500,000 and forever thereafter, at 6 per cent to be paid by the city. These terms require that the property be developed into an airport and for railroad and marine purposes. The Federal government will reserve, also, the right to use the airport and seaplane base for government and military planes without charge, except for shelter, improvements and service. The cost of all improvements is, of course, to be borne by the city.

The sum of $1,000,000 has been authorized by the city for expenditure on the Hog Island Airport. Plans have been approved and as soon as City Council passes on the sale of the ground, development work will begin. The ground will be divided into three plots —one part for an airport, an area of approximately 657 acres; another area of about 84 acres for a seaplane base, and the balance, some 610 acres, to be held for rail, marine and industrial purposes.

The first aircraft company that has opened negotiations for location of a plant at Hog Island is the Dornier Company of America. Louis C. Huck, vice-president and general manager of the company, flew to Philadelphia recently for a conference with Mayor Mackey. The Dornier company, a German concern, which recently incorporated in the United States, is looking for a site to establish its headquarters in America.

Boston Port Rules Published

BOSTON (MASS.)—Rules and regulations now in force at Boston's improved municipal airport have been published in booklet form by the Park Department, which has charge of the port. Traffic is reported to be heavy at Boston this season and there are fourteen scheduled departures and arrivals of mail and passenger planes in addition to the general activities. Colonial Air Transport is still the largest single user of the airport.

AIRPORT CONSTRUCTION PROJECTS

West

THE field of the Hancock Foundation College of Aeronautics, Santa Maria, Calif., has recently been enlarged to a total of 143 acres, the entire surface of which is surfaced and available for take-off. The added land makes possible the extension of the east-west runway to 3,900 ft. and the north-south runway to 2,000 ft. in length. The field is now completely equipped with lighting facilities.

Ground has been broken for the Fontana (Calif.) emergency landing field by the Department of Commerce. The field will have a radio range beacon of 400 mi. range in addition to standard emergency field lighting equipment and ground facilities. Work is expected to be completed by the middle of July.

The purchase of Mission Airport, which adjoins Pasadena and is about 10 mi. from Los Angeles, is being negotiated for by a group of Pasadena business men. If plans materialize, about $50,000 worth of equipment will be installed at the port, which comprises 160 acres.

Lighting installation at the Chehalis (Wash.) Airport will soon be completed, according to reports.

Central

Proposals for improvements to the Kansas City (Mo.) Municipal Airport have been made to the city by Roy C. Farrell, manager of the port. He suggests two additional runways, the grading of about 150 acres, widening the concrete taxiway near the passenger station, and oiling a portion of the field. The estimated cost is about $40,000.

Work on improvements to the Council Bluffs (Ia.) Municipal Airport has been halted by the contractors who claim that they have been unable to sell the airport certificates authorized at a special bond election. The city threatens suit for damages if work is not resumed. About one-eighth of the work has been completed.

The Omaha City Council has awarded a $109,000 contract for grading and preparing runways at the municipal airport to the National Construction Co. An ordinance providing for the appraisal of 200 acres adjoining the field was given first reading at a recent meeting of the Council.

At the Nicholas-Beazley Airport, Marshall, Mo., the Department of Commerce has installed beacon and markers, and will soon have boundary lights in operation. The Department has recently equipped the port with weather reporting apparatus, including a teletype telegraph printer.

The Building Commission of Clay Center, Kan., has sanctioned improvements to the municipal port which include the construction of 50x60-ft. hangar, and parking space. It is planned to erect an administration building later.

The Rochester (Ind.) Airport has been leased by the Flora Aviation Co., Inc., who are making improvements there preparatory to the dedication on July 4.

The new concrete bridge over Cold Water Creek at St. Louis Municipal Airport is reported completed.

North Central

The administration building under construction at the Wold-Chamberlain Airport, Minneapolis, will cost approximately $57,000. It is a two-story structure of brick and reinforced concrete and measures 40x143 ft., with a 22x34-ft. garage on the north side.

Construction has begun on the Vilas County Airport at Phelps, Wis.

East

At the Springfield (Mass.) Airport, construction of a traprock and macadam apron has been completed. Other improvements under way are the erection of a fence along the west border and the filling in of a depression between runways.

At Easton, Pa., the International Airports Corp. of New York City will shortly begin the construction of an airport, the total cost of which will exceed $500,000, according to present estimates.

The Titusville Airways Co., Titusville, Pa., has let the contract for construction of 60x80-ft. hangar at the municipal airport, and the runways are being graded.

Wiring of the hangar at the Hattiesburg (Pa.) Airport has been begun, and the airport will soon be ready for use.

Work is about to begin on the new Halifax (N. S.) Airport. The contract for its construction, involving $101,175, has been awarded to Hanratty & Bianco.

Airport, Inc., Baltimore, Md., has begun the preliminary work of grading Rutherford Field.

South

Recent improvements at the Houston (Tex.) Municipal Airport include a one-room addition to the administration building and the conversion of the passenger waiting room into an office for Southern Air Transport. Experiments on field drainage are being conducted under the supervision of C. P. Neuhaus, airport manager.

Improvements in progress at the Gulfport (Miss.) Airport include the addition of a new runway, the widening of one of the old runways from 400 to 500 ft., and the rearrangement of border lights. It is hoped to complete the work before the dedication on June 4.

Work of grading the Birmingham (Ala.) Municipal Airport has begun, and E. W. Standford has been named architect for the airport buildings. Approximately $3,000,000 is to be spent in developing the port.

Fayetteville, Ark., has voted a bond issue of $20,000 for improvements to the municipal airport. It is planned to enlarge the field to a total of 70 acres, install lighting, and build hangars.

Improvements Made At Tucson City Port

TUCSON (ARIZ.)—Among the improvements at the local municipal airport is the recently completed combined administration building and passenger depot costing about $6,000. Spanish architecture has been used in the design. Structural materials are of brick and stucco, the roof of tile and composition. It is 50 ft. 5 in. long and 36 ft. wide. A low porch and receiving platform is built on the east side of the structure.

The new depot provides a waiting room, two offices, baggage room, lunch counter and rest rooms, and is electrically lighted. The building will be heated. The building is situated at the extreme southwest corner of the landing field.

The new lighting equipment includes 34 amber boundary lights, placed at 300-ft. intervals about a landing field measuring 3,500 ft. east and west, and 2,700 on the north and south. These lights are non-fixed and stand 10 ft. inside the boundary fences of the field.

Seven field flood lights, standard 32-X Crouse-Hinds projectors, have been installed. There are four 110-volt hangar flood lights, five 110-volt administration building flood lights, one 110-volt ceiling projector, one regular type beacon mounted on a 50-ft. tower which revolves 6 r.p.m., lighted wind cone, one B.B.T. flood light, 10 kw. incandescent lamp of 110 volts to be used as an auxiliary to the field floods.

Eight obstacle lights have been installed to protect against the Southern Pacific railway lines and telephone and telegraph lines at the south of the field. The lighting cost $10,000.

Little Rock Depot Leased

LITTLE ROCK (ARK.)—Formal transfer of the Little Rock Intermediate Air Depot from the War Department to White Bros., of Russelville, Ark., a cotton concern, took place May 19. White Bros. was the successful bidder for lease of the field, offering to pay $200 a month for 5 yr. and to keep the property in good condition. Command-Aire Flying Service, Inc., was the only other bidder. It is believed that the cotton company will install a cotton compress in the warehouse and compress and store cotton and will sublease the flying field and office space to a flying concern. The Arkansas National Guard will continue to use the field.

Central Airport Reports Income

CAMDEN (N. J.)—A net profit before depreciation of $1,051 for the year ending April 30 has been reported by Central Airport. After depreciation, there was a deficit of $19,233. The corporation stated that total income during the year, the first of its operation, reached $55,011 and total expenses were $53,959.

Airway Briefs

Airport Development & Construction Co., Philadelphia, Pa., has reported that a suitable airport can be built at Catfish Point, near Tampa, Fla., for $591,-362, including cost of the site. The city has thus far issued $175,000 in bonds for the project.

Delta Air Services, Inc., has ordered three tri-engined Fokker planes for use in its Dallas-Atlanta route. It is anticipated that the six-passenger planes now in use will be transferred to the proposed Little Rock-Memphis route.

Ex-President Calvin Coolidge was scheduled to read the address of Henry L. Bowles at the dedication of Bowles Agawam Airport, Springfield, Mass., May 30, as Mr. Bowles is not yet recovered from a recent illness. Northeastern Aircraft Corp. is the first company to start flying activity at the new port.

Phoenix (Ariz.) Sky Harbor has been acquired by Acme Investment Co., not including the administration building and hangar. The company has offered to sell the airport to the city, but the offer has not been taken up, as there is already one municipal airport.

Gasoline and oil concessions are offered for sale by the city at Love Field, Dallas, Tex.

All planes operated by Thompson Aeronautical Corp., Cleveland, Ohio, are to be equipped with two-way radio telephone outfits, ordered from RCA.

The tri-engined T.A.T.-Maddux Ford plane which has been on exhibition in the Pennsylvania Station, New York City, for nearly a year, is to be put into regular service, owing to pressure of traffic. It will be the twentieth plane in the company's active fleet.

Izaak Walton Airway is planning lines from Detroit and Minneapolis to the wooded regions of Michigan, Minnesota and Wisconsin.

New England & Western Airways is considering establishment of an Albany-Buffalo extension.

Flying school and charter work is to be discontinued by the owners of Houston (Tex.) Main Street Airport, Inc.

City Council of Nashville, Tenn., has created an airport committee with power to select a site and contract for purchase of land for an A-1-A airport. A $1,000,-000 airport bond issue will be voted on June 26.

The municipal airport at Lonoke, Ark., was dedicated May 30.

George E. Marsters Co. has established a consolidated ticket office for airlines in Boston, Mass.

W. W. Stevens has leased the Ontario (Calif.) airport from the city for one year.

Pacific Air Transport's Seattle-Los Angeles mail and passenger service is to be extended to San Diego June 15. Offices in San Diego will be in the Airtech Flying Service building at Lindbergh Field, where a weather bureau will be installed. Boeing 40-B-4 planes will be used.

Curtiss-Wright Flying Service is considering plans for special service from Boston to Hyannis and Newport, R. I., in connection with the yacht races.

Colonial Airways System has accepted delivery of two additional Sikorsky S-38 amphibions, to be used on the New York-Montreal line.

With the appointment of a permanent field manager at Lambert-St. Louis municipal airport, the salary has been raised from $1,800 to $3,000 per year.

Culver City Airport, intended primarily for use by women pilots, was opened May 9, at Culver City, Calif.

The Post Office Department has disapproved a request for a stop at Baker, Ore., on the Pasco-Salt Lake City route.

Robertson Mississippi Line Attracts Passengers

MEMPHIS (TENN.)—Patronage of the daily St. Louis-Memphis-New Orleans passenger line of the Robertson Airplane Service Co. has averaged 80 per cent capacity during its first three weeks of operation, officials have announced here. On several trips, passengers have been refused accommodations for lack of room.

The service was opened April 28, using six-place Ryans, powered with 300 hp. Wright Whirlwinds. Frank H. Robertson, St. Louis, president of the company, had announced that service would be opened July 1, but suddenly announced immediate service only the day before the first trip.

The company is considering Ford transports, instead of the eight-place Curtiss-Kingbirds that will be ready July 1. A Memphis-Little Rock-Hot Springs daily line has since been opened by the same company, but it has not received equal business. Curtiss-Wright Flying Service of Memphis services the planes at the Memphis Municipal Airport, maintains a ticket office and operates an information bureau.

T.A.T.-Maddux Personnel Facts

LOS ANGELES (CALIF.)—In the flying personnel of the western division of T.A.T.-Maddux Air Lines there are at present sixteen pilots and fourteen co-pilots in active service. The oldest pilot is 55 years of age and the youngest 22. The oldest co-pilot is 38 and the youngest is 24. One pilot has more than 7,000 hr. in the air to his credit, three have more than 5,000 hr. aloft, four have passed the 4,000-hr. mark, six have been up for more than 3,000 hr., and four have 2,000 hr. or more to their credit. All co-pilots are also licensed mechanics and all but one has more than 2,000 hr., the one exception having approximately 1,800 hr. of flying time. Three-fourths of the flying personnel has received Army or Navy training.

Curtiss-Wright Runs Maine Passenger Lines

ROCKLAND (ME.)—An interesting passenger operation is being carried out between this city and Bangor, and between here and islands in Penobscot Bay by William H. Wincapaw, local manager of the Curtiss-Wright Flying Service. The Bangor service is flown twice daily, using a Travel Air cabin plane. The service linking up the islands covers in about 20 min. what the boats negotiate in about 2 hr.

The schedule for the 65-mi. trip to bangor is as follows:

	a.m.	p.m.			a.m.	p.m.
lv.	8	1	Rockland	arr.	9:30	2:30
arr.	8:30	1:30	Bangor	lv.	9	2

The fare one way is $7.50 and round trip is $14. During April there were twenty flying days and 46 passengers were carried. The company has a small airport here and a seaplane base on the water front equipped with a ramp so arranged that it will be usable at all tides.

It is planned to operate a regular service between Portland and Bar Harbor this summer. Beside the Travel Air, the base is equipped with a Fleet, two Fledglings, a Challenger Robin and the OX-5 Robins, two Moths and a Fairchild on pontoons. The Fairchild is completing a charter mission carrying freight, mail and special supplies between a northern lumber camp and an outside base of supplies.

Airlines Speed Up Schedules

NEW YORK (N. Y.)—A number of changes in airlines operations have been announced here. Twenty minutes have been cut off the running time of the Universal Chicago-Cleveland plane, the transport arriving at Cleveland at 7:20 p.m. instead of 7:45 p.m. Starting June 1, another hour will be cut off the Pacific Air Transport schedule between Seattle and Los Angeles. This will mean that the running time will be 3 hr. shorter than it was before.

Widow Awarded Fund for Crash

DAVENPORT (IA.)—Mrs. Pearl Sullivan, widow of Chester Sullivan, pilot for the Illinois-Iowa Airways, killed a year ago when his plane went into a tail spin and crashed while he had a student flyer up, has been awarded $4,500 by the Iowa industrial commission. Sullivan was the father of two children and the industrial commission made the award, in part, upon basis of his earning capacity, Sullivan receiving $5 an hour at the time of his death.

Hotel Firm Gives Air Insurance

DALLAS (TEX.)—Baker Hotel Corp., operating ten hotels, has inserted a new clause in its guest insurance policy providing coverage for travel in licensed planes and dirigibles, all expense being defrayed by the hotels. The policy is good 24 hr. after leaving a hotel.

FOREIGN ACTIVITIES

Miss Johnson Finishes London-Australia Flight

PORT DARWIN (AUSTRALIA)—Miss Amy Johnson landed her Moth plane here May 24, completing a solo flight from Croydon, England, in 19½ days. Although she failed by four days to equal the record established by Bert Hinkler three years ago, her flight is equally creditable since she spent more than that time waiting for repairs to be made at various points along the route. She has received telegrams of congratulation from King George, Prime Minister MacDonald, and Parliament is considering a suitable honor in recognition of her achievement.

Her route was from Croydon to Paris, Vienna, Constantinople; Syria; Persia; Allahabad and Calcutta, India; Rangoon, Burma; Bangkok, Siam; Singapore, S.S.; Tjomal, Java; Semarang; Port Darwin, Australia. She has flown on to Sydney, escorted by five R.A.A.F. planes, and expected to reach Brisbane May 28. She experienced forced landings in Syria, at Rangoon, and Singgora, Malay Peninsula. The 900-mi. over water flight which constituted the last stage of the trip was fortunately uneventful. Miss Johnson, only 23 yr. old is a licensed mechanic as well as a pilot.

Doolittle Party Visits Turkey

CONSTANTINOPLE (TURKEY) — Lieut. James Doolittle and three other American pilots demonstrated Curtiss-Wright planes at San Stefano Airport May 19, after the group had flown from Bucharest. Visits will also be made to Eskichehir and Angora. On April 29, the four gave an exhibition at Tatoi Airport, near Athens, Greece, before the vice-president of the Republic, many prominent statesmen and military officers, and what was reported as a very large crowd. Northern Europe comes in the latter part of the fliers' schedule, and it is expected that the tour will continue until about Aug. 1.

May Omit 1931 Schneider Race

LONDON (ENGLAND)—There is considerable uncertainty as to whether or not the Schneider Trophy races will be held in 1931, due to the decision of the British Government not to participate. The Air Ministry has announced, however, that the 1929 racers may be loaned to their makers or any responsible party who wishes to enter them for the next contest. Entries must be made by the end of July and, as previously announced, a guarantee of about $8,000 will be required from each entrant.

Foreign Briefs

On April 27, a party of fifteen men and fifteen women, in fifteen light planes, left Littorio Airport, Rome, and flew together to a field about 35 mi. away, where they had a picnic tea. At the conclusion of the "Aero Party," arranged by the Aero Club of Rome, the planes returned together to Littorio.

Service over a new airline between Belgrade, Yugoslavia, and Salonika, Greece, was started May 4.

Recommendations for uniform, strict health rules to be applied in international aircraft travel were approved by delegates from forty nations attending the health congress held in Paris recently under the auspices of the League of Nations.

At the close of the meeting of the French Federation Nationale Aeronautique at Oran, Algeria, May 9, it was decided to hold the next meeting in Paris in 1931, in conjunction with the Colonial Exhibition.

Societe Generale de Transport Aerien (Farman Line) opened a Paris-Berlin night service May 1. One stop is made, at Cologne.

A meeting of the International Technical Committee of Aeronautical Juridical Experts was held in Paris early this month, with delegates from 29 countries attending. Responsibility for damage to property on the ground, and the legal status of aircraft crews were among the topics considered.

DeHavilland Aircraft Proprietary, Ltd., has erected hangars and a workshop at Mascot Airport, Sydney, Australia.

According to latest report, there are 35 flying clubs in New Zealand, and plans are under way for forming an association.

Daily airline service has been inaugurated between Budapest, Kaposvar, and Peca, Hungary.

The annual conference of the F.A.I. will be held in Paris this year June 8-15. This is the 25th anniversary of the founding of the F.A.I.

A parade of new and experimental types of aircraft, omitted last year from the annual Royal Air Force display at Hendon, will be included in this year's program.

Effective June 1, there will be 50 departures of planes on scheduled airlines daily from Croydon Airport.

U. S. Department of Commerce has issued a 60-page bulletin on "Airports in Latin America," which may be purchased for ten cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Graf Zeppelin Crosses Atlantic Again in 62½ Hr.

RIO DE JANEIRO (BRAZIL)—After a stay of only 70 min. here, the Graf Zeppelin started her return journey to Pernambuco, and was expected to start from there to Havana May 27. The airship was landed here at 6:30 a.m. May 25, just 30 hr. and 38 min. after leaving Pernambuco. The voyage took only about 24 hr., but it was thought advisable to cruise over the city and harbor until morning before attempting a landing. Several notable visitors came on board during the short stay, and a small number of additional passengers were accepted for the trip to Pernambuco.

As on previous occasions, the Zeppelin's trans-Atlantic voyage was accomplished without incident. The ship stayed 27 hr. in Seville, taking off at 4:30 a.m. May 20. There had then been a 12-hr. delay due to a lack of proper supplies. Constant radio communication was maintained, and reports of progress were sent out regularly. The Canary Islands were passed at 11:00 p.m. the same day, and the Cape Verde Islands at 1:15 p.m. May 21. Mail was dropped at Porto Praia, Cape Verde Islands. Continuing at a steady rate of about 60-65 m.p.h., the big airship crossed the equator at about 5:00 a.m. May 22, and landed at Pernambuco at 7:05 p.m. on that day. The distance from Seville to Pernambuco is about 3,750 mi., and the time between take-off and landing was 62 hr. 35 min., according to the early reports.

Open French Line in Venezuela

MARACAIBO (VENEZUELA) — Twice weekly mail, express and passenger service between Maracay, Maracaibo, and Ciudad Bolivar has been inaugurated by the French company, Aeropostale. The fare from Maracay here is about $96.50, and to Ciudad Bolivar, about $106.15. The basic postal rate is about $.15 for ten grams (⅓ oz.), and follows a special schedule for additional amounts up to about $.60 for 50 grams (1¾ oz.). Latecoere 26 planes, powered with 450 hp. Renault engines, carrying five passengers and mail, are used on the new service.

Rohrbach Plans New Mail Plane

BERLIN (GERMANY)—Tentative plans for a new flying boat which is designed to be able to carry 1,500 lb. of mail on a non-stop flight from the Azores to Bermuda have been completed by Dr. Adolf Rohrbach. The plane would use three Wasp engines.

WHAT OUR *Readers Say*

Airline Revenue

TO THE EDITOR:

Through your magazine, AVIATION, I have been following the efforts being made to stimulate passenger carrying by "publicity," "reduction of rates," etc., and I wonder if we are really making progress.

Let me qualify my remarks by saying that I am not in the aviation business and my only connection with it is chairman of a Commission of five men that operates a small municipal Airport.

It is generally recognized that there has been a slump in aviation since last summer but what line of business has not slumped? If other lines of business were good, then aviation would be good but a great many of our major industries are passing through a very serious depression right now so it is natural to expect aviation to feel the effects of all of this.

Flying is not popular with the general public yet and it will not be as I see it for a long time, regardless of the cost of air transportation. The public has got to be educated to flying and it is a slow process. The children of today are ready to fly but their parents are not and the day when the air is full of planes is when the present young generation grows up and can pay for their own rides. One large aircraft manufacturer said to the writer last year at the Detroit Show that "in five years there would be as many planes in the air as automobiles on the ground." One of these five years he spoke of has already slipped by and we are no nearer his goal than we were a year ago and when the other four years roll by, this man will see that he was letting his enthusiasm talk and not his common sense.

The aviation industry must have revenue and they cannot wait until the younger generation grows up, so it is desperately trying to coax the public into flying in order to make present-day operations pay. Of course more passengers mean more planes in service and this means increased sales for the manufacturer and that is one of the ends toward which the industry is working. But, cannot this ultimate end be approached in a different way? Let us look at the other side of the picture.

The one, steady, paying branch of the industry at present is air mail. This business has created a big outlet for the sale of planes and it is growing all of the time—it is a paying investment. There has been no thought of this service slowing down during our recent period of depression in general business all over the country but on the other hand the air mail business is steadily growing.

Why can we not look around and find something similar that will pay while we are waiting for the public to become educated to flying?

In the writer's humble opinion, there are two tremendous sources of revenue that can be developed by the aviation industry and so far the surface has not been scratched; I refer to Air Express and Air Freight.

So far, very little effort has been exerted to develop these two sources of revenue although the possibilities are enormous. Two things are necessary—the express and freight must have *considerable value* and it must be a "two-way" load just as air mail. Low value express and freight would be out of the question, but such articles could be moved as radio parts, electrical appliances, men and women's wearing apparel, dress goods, cosmetics, drugs, shoes, valuable automobile parts, typewriters, adding machines, food products of high value, perishables such as fruit and vegetables, fancy groceries, etc. There are literally thousands of articles that can be moved by air express and air freight and two big arguments are "quicker service" and "interest saved," enabling stores to carry smaller stocks. Imagine daily Air Express and Air Freight between New York and Atlanta or Chicago and Atlanta or Dallas —think of the immense tonnage that could be developed.

Here is a specific instance—Raw Silk is brought into San Francisco in solid boat loads. Immediately this product is loaded onto a special train known to railroad men as the "five-million-dollar special" and this silk is rushed to the Eastern markets, New York, Philadelphia, Patterson, etc., this train being moved with all possible speed and has the same clearance orders as a passenger train. At its Eastern terminus, this train is broken up and the car loads are distributed in large and small amounts to the silk industry, located along the Eastern seaboard. This raw silk is worth $5.00 a pound. Why could not this distribution at New York be done by plane?

Air Express and Air Freight would mean a large sale of planes, more pilots and mechanics, more servicing facilities, repair parts and plane replacements. This business could be developed to such an extent that regardless of whether the public flew or not, the aviation industry would be on a paying basis. The general public has been greatly impressed with Air Mail and the same thing would be true with Air Express and Air Freight and it would certainly prove a stimulus to passenger flying.

MILTON G. SMITH,
Greenville, N. C.

[Mr. Smith's remarks are all the more interesting in view of the fact that they come from one not connected with the aeronautic industry. Fortunately commercial air transport operators hold the same views, and we may confidently expect considerable development in air express and air freight in the immediate future.—Ed.]

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Steep Climbs

TO THE EDITOR:

When I returned from the St. Louis Air Show, I intended writing you immediately but was called out of town and have just returned. I feel so strongly on the subject that I am going to write you even at this late date.

During the St. Louis Show I spent a day at the airport where the planes were being demonstrated. The form of demonstration which seemed to be particularly popular was to take a short run then put the plane into a straight, steep climb and keep it there. All that was necessary to bring about a crash and undoubtedly a casualty was for the motor to miss.

I went up for a demonstration and immediately we were off the ground the pilot put the plane into as straight a climb as was possible. The plane was equipped with dual controls and I simply shoved the stick forward and said I wasn't interested in a plane for that sort of thing nor was I interested in that kind of demonstration unless we were up at least a couple thousand feet.

I honestly think such demonstrations are harmful to the industry, and they certainly do add greatly to the hazards. Perhaps the Department of Commerce does not have the authority to put a stop to such things, but if they do, I strongly recommend that rules and regulations be put into effect forbidding demonstrations of steep climbing at heights of less than 1,500 feet and at least a mile from the airport.

I noticed also many flyers doing chandelles near the ground. This is another thing which I believe hurts rather than helps the industry and adds to the hazards of flying.

MERRILL C. MEIGS,
Vice-Chairman,
Chicago Aero Commission.

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The OX-5 Engine

TO THE EDITOR:

I am now going to draw down upon myself the wrath of many manufacturers and various and sundry pilots,

some old war-time flyers who no longer fly, but who cherish maudlin sentiments regarding the faithful (?) OX-5.

It is true that the old OX has been a wonderful engine and post war aviation would have been at a loss without it. However it has served its purpose and should be speedily relegated to the limbo before it ruins its past reputation and breaks the hearts of its former and present misled admirers.

To my mind the OX has no place in modern aviation, and it is inconceivable that reputable manufacturers should continue to jeopardize their products by installing in their ships these twelve-year old power plants, especially in view of the fact that there are so many excellent modern engines now on the market.

Erroneously it is believed that price is the basic argument. The law of supply and demand does not apply in the present situation; until the market is cleared of these old mills, engine manufacturers are hindered in production by lack of demand. As soon as there is a steady enough demand for modern engines of the equivalent power of the OX, manufacturers will be able to create a line production supply of engines at a much lower price than at present.

Airplane schools and dealers may also be censured for using these cheap old engines as a price argument when they find their prospects hedging on a more expensive deal. I know from experience that often prospective pilots are urged to buy OX machines to build up hours and to purchase a more powerful plane after learning to fly.

This is as foolish as training a future virtuoso on a fifteen dollar fiddle. It is criminally foolish in our business because while fiddles may annoy they seldom kill.

I may be unduly prejudiced because I do not sell OX powered planes, and because I know that the altitude of my territory forbids the operation of OX machines with any degree of safety. However, I am sure that they are hindering the progress of aviation in general. As Chick Sale says: "I'll tell you why."

It will be necessary for me to localize my argument. In this state during the past two years there have been eight bad crackups, four of them fatal accidents directly traceable to the faithful OX-5 engines with which the planes were powered. As a typical example: this week a friend of mine who had been flying J-6 ships accepted a job as instructor on an OX plane—a nice new shiny one of respected manufacture. It was all right solo, so he started aloft with his first student. He wished the thing up a couple of hundred feet and was confronted with a low hill. Being used to more power, he nosed her up just that inch too much. Result, stall —off on a wing—engine, student, and pilot a mass of—well, read any newspaper account.

All of which is certainly making the people of this state air minded, and all of which is certainly helping our beloved industry.

The Department of Commerce should rule the OX-5 engine out of the air at once for the following reasons: it is obsolete, being twelve years old, and of hasty wartime production; it is dangerous, being equipped with one ancient magneto, having low power, and being outrageously heavy by comparison. OX-5's hinder progress. Engine manufacturers, dealers, and plane builders cannot compete with the prices of these old coffee grinders which still flood the aviation field. Lastly, and most important, they are killing off pilots and students upon whom the future of aviation is largely dependent.

Regardless of the sentiments of the old timers, I can find no kind word for the OX-5 engine. It is a dangerous hangover from the World War, and is just as appropriate in our business as a nice little souvenir fragmentation grenade is around the house for the kids to play with.

OX-5's are killing our fellow pilots and retarding the entire aviation industry. For the love of the game, let's be smart and get rid of them before they do any more damage. Is any other pilot with me?

NELSON STORY, III.
Boseman, Montana.

New Volumes
FOR THE SHELVES

Radio

RADIO AND ITS FUTURE: *A Symposium edited by Martin Codel; Harper & Bros., New York, 1930; price $4.00.*

TWENTY-NINE leaders in their respective branches of the radio field have contributed articles to this volume, ranging from a discussion of radio in military communications by Maj.-Gen. George S. Gibbs, U. S. A., to a consideration of television by Herbert E. Ives. Naturally, it was impossible by this method to cover any phase of the subject with real thoroughness, and there is some inevitable duplication; but for the reader who is looking for a survey, this work should prove surprisingly satisfactory.

Only one of the articles ("Radio for Safe Flying," by F. C. Hingsburg of the Airways Division) is chiefly concerned with the use of radio in connection with aircraft, but the subject is prominently mentioned in many of the others, and a considerable part of the information given will be found invaluable to those interested in the subject, even though some of it may seem elementary. Captain Hingsburg confines himself mainly to a description of progress already made in aeronautical radio, details of which are familiar in the industry. He predicts, as might be expected, that all passenger-carrying aircraft will be required to carry radio equipment, and foresees the early practical application of such devices as radio direction-finders and altimeters which are now in an advanced experimental stage. Since his article is written for laymen, it contains comparatively little which is not commonplace to those interested in the subject.

Paradoxically perhaps, but quite naturally, some of the other discussions are likely to be much more valuable to those in the aviation industry. The four articles on regulation, dealing largely with legal aspects of radio communication, present a fairly complete picture of limitations which must be kept in mind, national and international difficulties which may arise, as well as possibilities of development under intelligent control. It is certainly wise to emphasize at the present time, while the problems of application of radio to aviation are still largely in the hands of technicians, that their successful solution will not be satisfactory if it threatens interference with other uses of the limited wave band available for the whole radio field.

Part V, devoted to "Some Scientific and Other Considerations," also contains some mention of radio in aviation, though it is largely concerned with more general possibilities. Not unnaturally, most of the contributors to the whole volume are strongly inclined to optimism, and in some cases the subject seems to be what we hope radio can do, rather than what radio may be expected to accomplish on the basis of present development. On the other hand, Mr. Ives, electro-optical research director of the Bell Telephone Laboratories, is inclined to take a fairly pessimistic view of television, as compared with recent newspaper articles on the subject. Despite reports that weather maps have been successfully sent to moving airplanes by radio, one would conclude from Mr. Ives' statements that extensive practical use of the process will present serious difficulties. Specifically, television requires the use of a wave band at least five times as wide as that used by other forms of radio communication, and it

is doubtful if it will be considered sufficiently important, or sufficiently economical, to be assigned the necessary channels. Of course, technical improvements may remove these difficulties, but up to date there is no very firm basis for predicting that such will be the case, except that there have been other phenomenal technical improvements in the past.

Other important references to radio in aviation may be found in articles on "Maritime Radio," by A. Y. Tuel, "Radiotelephony," by E. H. Colpitts, "The Radio Structure," by Martin Codel, and "Radio in World Communications," by Maj.-Gen. James G. Harbord. In addition, even a hasty reading of the whole volume should give a sense of perspective highly desirable for all those who are directly or indirectly concerned with radio developments.—CHARLES E. NOYES, *Assistant Editor of* AVIATION.

Abstracts AND *Reviews*

Air Cooling and Townend Rings

THE RESISTANCE OF AIR-COOLED ENGINES AND THE TOWNEND RING; *by Major F. M. Green and H. C. H. Townend; paper read before the Royal Aeronautical Society of Great Britain, March 6, 1930.*

MAJOR GREEN'S paper developed quite interestingly the complete history and present day practice of air cooling for engines. Slightly less than one-third of the energy developed in an internal combustion engine is given off by the cylinder and piston. The loss of heat in such an engine is nearly proportionate to the velocity of the cooling air passing over the cylinders. The faster the airplane the better the cooling. Hence on a high speed plane it is permissible to reduce the cooling area of the engine. Two ways to do this present themselves: First, the weight of the engine may be reduced by the use of a smaller number of pins; or, second, the engine may be cowled so that the entire slip stream does not pass over the cylinders of the engine.

Major Green stated that his paper started with a discussion of the cooling of air cooled engines instead of with the drag, since these two subjects were intimately tied up with each other and it was impossible to discuss one without bringing in the other. Any addition of drag to a body by an air cooled engine may be considered as a measure of the hp. required for air cooling. The higher the speed, more and more important becomes the need for reducing this loss. With minor exceptions the amount of heat to be dissipated by an engine does not depend upon the arrangement of its cylinders. The 1909 Gnome was the first successful air cooled aircraft engine. Since aircraft at that time had a maximum forward speed of from 35 to 40 m.p.h., not enough air passed over the cylinders of the engine to cool them properly and also at this speed the drag of the engine was of no great importance. The Gnome engine owed its success to the fact that its cylinders revolved at a high rate of speed and thus provided their own cooling. It is true that these early rotary engines were provided with cowling but this was more to prevent the escaping oil from blinding the pilot than to reduce the drag. From these early air cooled engines the next type to be developed were the 8 and 12 cylinder Renaults. These V engines were at first equipped with fans to provide the air for the cooling but it was soon discovered with the higher speed produced by the larger engines it was possible to do away with the fan and depend upon the slip stream alone. The development of fixed radial air cooled engines was quite slow, due to the low forward speeds of aircraft. Due to the improvement in materials and an increase in speeds these engines have now been highly developed and it is with them that the paper chiefly deals.

The paper deals with air cooled engines in the nose of a fuselage and those isolated in nacelles. With the exception of some figures quoted from N.A.C.A. reports all data in the paper is taken from experiments conducted in the wind tunnel at Sir W. G. Armstrong Whitworth Aircraft Works.

The drag of a Jaguar is between 70 and 80 lb. The drag of a typical two-place airplane is 20 lb. Combining the body and the engine with no attempt at fairing, the drag is 55 lb. The R.A.E. developed a cowling in 1919 somewhat similar to the N.A.C.A. cowling. The addition of a spinner on the propeller reduced the drag from 56.4 to 44.5 lb., while the addition of cowling between the spinner and the engine made very little difference.

As to later developments, Major Green stated that the Townend ring when fitted around a Jaguar engine reduced its drag to just over 30 lb. The shape of the ring is fairly important. It has been found that a thin ring of airfoil section is most practical and it has not been possible to date to make any other use of this except as a fairing. Such a ring was tested at full scale upon a Siskin airplane and the increased speed predicted from the wind tunnel test was achieved. If an airplane flies too fast, an engine is cooled more than is necessary, which greatly lowers its efficiency. There is no reason why a cowling should not be developed which will keep the horsepower required for cooling to a constant amount by the reduction of the air velocity over the cylinders. This subject has not been fully investigated as yet. For every engine there is a minimum cross section of body which will give a minimum drag. If the Jaguar engine were fitted to an airplane for racing purposes, the body would have to be larger than necessary or a decrease would be necessary in the horsepower required for cooling. For this reason Major Green considers that radial air cooled engines are unsuited for racing purposes.

At 100 f.p.s. a typical military aircraft has a drag of 30 to 33 lb., of which 10 lb. may be credited to the cooling of the engine. Much the same tests were conducted on a Genet engine and the results followed closely those on the Jaguar. The best figure for drag yet obtained in the wind tunnel for both body and engine complete is 20½ lb. for both the Jaguar and the Genet engine. One of the chief troubles in selecting a cowling to be used when designing an aircraft is the knowledge of how much cooling is required for the particular engine to be used. There is no absolute standard for the best working temperature of an engine. It is very unfortunate that faults and troubles arising from improper cowling, such as overheating, do not become apparent until after the engine in question has flown a great number of hours. The cooling of an engine is likely to be reduced by all forms of cowling. The Townend ring probably reduces it the least. This ring, Major Green believes, is far and away the simplest arrangement that is likely to work, but it has been very difficult to find a practical method of constructing it. Up to the present all such rings have been made of steel and have weighed approximately 30 lb. It is hoped to reduce this weight more than half in the future.

MR. TOWNEND delivered his paper in a very concise outline form. The origin of the Townend ring comes from early experiments on engines when there was no consideration of engine resistance. By gradual evolution the ring was developed to its present state. The first tests were made using the ring in conjunction with the resistance of a strut and the results obtained prompted the experimenters to see if the same reduction of drag might be accomplished by placing such a ring in the nose of the fuselage. It was, and still is, hoped that it may be possible to utilize the circular exhaust collector as a ring and at the same time incorporate an engine silencer. The first tests which were made on radial engines showed so much promise that later tests have been devoted entirely to that type with few exceptions. In an attempt to discover the most suitable angle for the ring relative to body axis, segments of the ring were

mounted on pins and were varied until the proper angle was found. At first it was discovered that the ring worked best when placed behind the cylinders, but this was shown to be due to faulty radial location of the sections. Mr. Townend next gave a physical explanation of the ring's action. Measurements of axial forces on the ring and body separately showed that, while the drag was down 25 per cent, the drag of the body and engine only was apparently greatly increased. The forward pull of the ring itself more than overbalanced this. This forward pull was large and negative. It was clearly seen that these forces were not drags in the strict sense of the word, but were the resultants of the true drag and forces due to the local pressure reaction between the ring and body, making the ring drag appear negative. Since the cylinders deflected streamlines outward, the ring section would be working at a large angle of incidence to the air stream so set up and would therefore exert an outward lift in such a manner as to cause an inwash toward the body surface at the rear of the cylinders. It was evident from this, then, that the ring tended to make the passage of air conform more to the ideal shape as though the engine were not added to the body.

Further tests have shown that the position of the wing in relation to the engine is vital. Mr. Townend showed in one instance where the same ring had in one case greatly reduced the drag and in another instance increased it 4 to 12 per cent. A trail of smoke was used to obtain further data in experiments. A jet of smoke was discharged just in front of the gap between two cylinders. When the ring was used the smoke clung very much more closely to the body surface than when the cylinders were entirely exposed. It was firmly established that the important feature in a ring was that its section should be working at a fairly high lift coefficient and it was quite probably that the best results would be obtained if the section were chosen to have a good lift coefficient rather than a low drag coefficient. At this point Mr. Townend stated all experiments were carried on in two dimensions. The cylinders were the same as before, but the body was two dimensions and the wing a pair of straight airfoils. Later results proved that this method gave results which checked accurately with full scale performance. The next step in the development of the ring was the test on larger models in which the engine details were more accurately reported. Tests on the Short Crusader with a Bristol Mercury engine showed a reduction of 34 per cent in drag and 11 per cent increase in speed. It was found that a ring used in addition to cylinder helmets reduced the drag still further. Tests made on engines having two rows of cylinders showed that the per cent reduction of drag increased with the number of cylinders up to nine in number. On this type of engine the best results were obtained with rings of cambered plate section. Reductions of just over 50 per cent were obtained.

At this stage of development full scale check tests were made. Different size rings and those of different shapes were tested and results closely checked those of the models.

A ring of thick symmetrical section was tested and proved fairly sensitive to its situation in relation to the engine cylinders. Anything tending to stall the section should be avoided and it is well to fair in the valve protecting covers with plaster of paris or other material. Presumably due to the stalling, this section greatly increases the drag when its velocity is below 50 f.p.s. The ring in the position developed is favorable to its use as an exhaust collector and silencer. Mr. Townend mentioned that another symmetrical ring of slightly more than half the camber, but otherwise the same, did little to reduce the drag. A ratio of the maximum thickness to chord for the larger ring was C.394. Mr. Townend then summarized the main results. Unless it is desired to use the ring as an exhaust collector, the thin cambered plate sections in general give the best results. A steady increase in drag reduction follows an increase of chord up to 12 or 14 in. and from there on its increase is slower. The best results were obtained with a camber of .09 to .10 chord. One explanation of the improved performance of a thick symmetrical section rather than a medium thick one might be the greater shielding of the valve rockers. The best possible angle of the chord line relative to the body axis depends upon the shape of the nose; however, it should be fairly flat. Rings having a chord 12 in. long should be situated close to the center line of the engine cylinder and larger rings somewhat further over the cylinders. The diameter of the trailing edge should be greater than that of the engine.

Other applications of the ring principle were then outlined by Mr. Townend. One of the tests showed that it was possible to greatly reduce the drag by introduction of an airfoil section at the point where the wing of the monoplane joined the fuselage. In concluding, Mr. Townend stated that wherever interference arose causing turbulence of an air flow, the drag might be greatly reduced by the addition of something similar to a guide vane and built of airfoil section to have good deflecting powers.

The ring must be securely anchored since tests have shown that the axial force tending to pull the ring and engine apart was very considerable. An increase in speed of 7 to 9 m.p.h. has been noted on a Siskin Jaguar machine.

New Patents

Airplane

1,748,302. LESSITER C. MILBURN, Cleveland, Ohio, assignor to the Glenn L. Martin Company, Cleveland, Ohio. Filed June 9, 1927. Serial No. 197,533.

TWIN-ENGINED AIRPLANES having their engines mounted in outboard nacelles may be greatly improved, according to the claims of this patent. In this invention the twin engines are mounted from 2 to 10 deg. away from the center line of the fuselage of the plane. It is claimed in the patent that this will overcome all difficulty in twin-engined planes, should one engine become inoperative, or when the pilot is taxiing. No rudder movement is necessary to maintain the plane on its course, regardless of the speeds of the engine.

• • •

Mooring of Airships

1,748,500. HERBERT V. THADEN, Detroit, Michigan, assignor to Aircraft Development Corporation, Detroit, Michigan. Filed January 22, 1924. Serial No. 687,689.

THE MAIN FEATURES of this patent are a large mast to which the air ship anchors its nose and a cradle for handling upon the field. An elevator arrangement sliding in a rotating track then brings the ship to the ground where its underside is securely fastened to a cradle runing on a circular track around the mast. It is then possible to discharge and take on passengers directly from the ground without the inconvenience of ascending a high mooring mast.

• • •

Wing Construction

1,751,957. TOM TOWLE, Detroit, Michigan, assignor to the Towle Aircraft Company, Detroit, Michigan. Filed July 5, 1929. Serial No. 375,972.

IMPROVED CONSTRUCTION for airplane wings is the subject of this patent. All spars and ribs are eliminated in this type of construction. The skin of the wings is made of corrugated dural sheet, and all the interior stresses are carried by a wavy sheet of corrugated dural riveted to the skin at the crest of each of the waves in such a manner as to form a complete truss. Small pieces of dural are inserted at the rivet joints to act as stiffening. It is claimed that this method of construction increases the strength of the wing and reduces the number of rivets necessary.

THE BUYER'S LOG BOOK

This Log is prepared by the editors of AVIATION *purely as a service to readers. All items are published free of charge, solely on their news value, and without any advertising consideration whatsoever. Manufacturers are invited to send in material for this section.*

Kawneer Airplane Tubing

METAL MOULDINGS AND TUBING for the aviation industry are now produced by the Kawneer Co., Niles, Mich. All standard sections and sizes of tubing are carried in stock and can be furnished immediately on order. The company also specializes in making up sections from the customer's specifications. All these tubing products are of welded construction rather than the drawn seamless type commonly found.—AVIATION, *May 31, 1930.*

Airport Surfacing

COLAS FOR AIRPORT SURFACING is manufactured and marketed by Flintkote Roads, Inc., Pershing Square Bldg., New York City, and a service organization is maintained by the company. This material is an emulsion of pure asphalt which can be applied without heat and is capable of binding a wide range of aggregates, including cinders and gravel. The manufacturer states that its use results in a permanently solid, yet resilient riding surface without the aid of regular traffic.

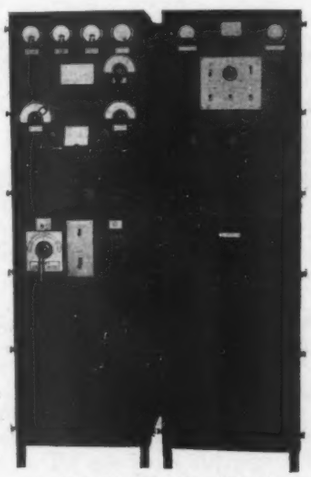
The following method was adopted at one airport using Colas in the construction of runways. As a foundation for the penetration macadam, a course was made up of sand and gravel and covered with 5 in. of waterbound material. After it had been sufficiently consolidated, a further course of graded stone was spread, rolled to a depth of approximately 3½ in. and penetrated with 1½ gal. of Colas to the sq.yd. This was covered with suitable ½ in. chips and rolled. After sealing with ½ gal. of Colas, the surface was finished off with finer material.

For adequate drainage, the minimum fall of a runway 100 ft. in width should be a grade from the center of 1 per cent, making the center 6 in. higher than the sides. Such a runway would require a 4 ft. shallow gutter of stone or slag on each side, under which can be laid a 24 in. perforated metal drain pipe and covered with loose whitened stones. This allows for a black runway with a white border and shows up well at night when illuminated for night landings. Colas may also be utilized for the surfacing of hangar floors.—AVIATION, *May 31, 1930.*

Surfacing a runway with Colas

Airport Transmitter

A NEW 200-350 WATT combined radio telegraph and radio telephone transmitter was recently announced by the Radio Corporation of America, 233 Broadway, New York City. This is of special interest to transport operators, being designed for both ground to airplane telegraph or telephone use, and for point to point radio telegraph work. The set has been developed with the idea that the telegraph feature will be utilized for all long range communications with airplanes and the radio telephone will be used for short range work.



R.C.A. 200-350 watt set

All parts of the set are oversize. The transmitter is arranged to cover wave lengths from 17.5 to 133 meters and operate on any kind of antenna desired, with provision for a quick front-of-panel shift to any two frequencies within a two to one frequency band. The transmitter utilizes a refinement of a standard master oscillator-power amplifier circuit. —AVIATION, *May 31, 1930.*

TRADE CATALOGS

▶*Packard Diesel Engine.* Special features of the new Packard Diesel aircraft engine are presented in a recent booklet of the Packard Motor Car Co. The Diesel principle is described and contrasted with that of the four-cycle gasoline engine by means of a series of diagrams. The booklet illustrates many parts of the engine and certain steps in the production process.

▶ *Westland "Wapiti."* Complete information concerning the Westland Wapiti used as landplane and seaplane is included in the new catalog published by Westland Aircraft Works, Yeovil.

Heated Flying Suits

A COMPLETE LINE of electrically heated flying garments has just been placed on the market by the Charles Laboratories, Los Angeles, Calif. Helmets, mittens, boots and flying suits are included, all of which incorporate a special heating unit and thermostat heat control. The material from which the suits are constructed consists of two sheets of khaki cloth laminated with a layer of India rubber by passing through rollers under a 13 ton pressure. An inner lining of virgin Australian wool is used and the lining of the suits is of mohair satin. The heating units are loosely stitched to the satin lining and customarily cover the small of the back, the chest, upper arms and thighs. The heat may be applied, however, wherever ordered by the customer.

The heating wire is manufactured by a special process which wraps from one to three strands of wire around a central core of cotton seine cord. The wire consists of ten strands of diamond drawn copper which is shellacked and double cotton wrapped for insulation. The suits are kept at a constant temperature of from 130 to 160 deg. Operation is from an ordinary storage battery on 6, 8 or 12 volts. Plug connections are used, with contact in the pockets.—AVIATION, *May 31, 1930.*

SIDE SLIPS

By
Robert R. Osborn

How to Buy a Jenny

The Intrepid Aviator and his partner-in-crime, The Sterling Mechanic, came in the office the other day and laid the following sheaf of notes on our desk, after first clearing a space by removing a number of our cigars. They explained that nowadays it was getting increasingly harder to obtain a good Jenny from any source, and they thought that the readers of Aviation might appreciate a few experienced pointers on what to look for when buying a Jenny. We realized at once that this was becoming a serious problem, and we knew that the boys knew whereof they wrote, so we have rushed to press with a special edition containing this information for our readers.

What to Look For in Buying a Jenny From a Fellow

1. Look into the gas tank. If the gas is considerable above the hump the ship is worth at least $2.00. It might even be worth $4.00 if the tank is full but if this happens be very suspicious that something serious is wrong with the ship, as we have never seen a full Jenny gas tank in our career.

2. Take out your pen knife and cut the shock cord in the landing gear on one or both sides. If it springs out it was OK but if it was dead the fellow was trying to gyp you. In any events tell him you won't take the ship unless he re-winds some new shock cord.

3. Count the number of bays in each side of the wing. If there is two bays each side with an overhang on the upper that is right. If the number of bays isn't even both sides insist that the chap should saw off the long side and trim up evenly as this makes the ship look much better and saves holding a lot of aileron and rudder. If the wing overhang is on the lower instead of the upper then the ship has either been crashed bad or the fellow wasn't thinking when he rigged it the last time. You can generally tell by looking at the fellow which it was.

4. If the wings are attached right side up the heavy curved side of the wing should be on top and it is only the modern sections like the Gottingen airfoils or the M-6 section which should look like they was on upside down. If he has the wing on upside down, once again it doesn't make much difference except in appearance and one panel or the other should be changed to be consistent. Remember it is the good appearance of the ship what counts with the perspective passenger.

5. Shake the wings violently up and down. That rattling noise is busted ribs an of course that is OK but be sure to complain about this so as to cut the price down. If the wing tip seems to be waving around a lot and loose, sort of, it might be a busted beam, so be sure to cut the cover to see. Do this while the ship still belongs to him, as you can't afford to inspect things like that after you've bought it.

6. Don't waste much time looking at the engine as it won't be worth much anyway. Just squint at it an say "Oh well, I have another engine I can put in the ship so it doesn't make so much difference that this one is so terrible. I can see it needs a new overhead, an new pistons an new rings and new gaskets an a new mag an a new crankcase so I guess I can use it for spare parts. "He will claim it has just had a complete overhaul an is singing sweet but this is obviously hokum for if the engine wasn't haywire why would he be selling the ship?

7. Look the longerons over somewhat. There should be at least three good longerons, especially aft of the cockpit as it is claimed it is embarassing to have the tail fall off at any height above three hundred feet, an on a good cool morning the ship might get higher than that.

8. Make sure that the wheels track together in some direction. They don't need to track straight ahead so long as they point together in some direction. When the wheels get more than thirty degrees off it isn't so much fun to fly though as you have to make all cross-wind take-offs and landings.

9. Look down inside the cockpits an under the turtleback to see what sort of vegetation is there. If grass and oats and such is sprouting green the ship has been left out a lot, whereas if the sprouts is yellow and maybe a mushroom or two is in evidence the ship has probably been either in a hangar or the shade, most likely the shade.

10. If you intend to use the ship for student training make sure you have the regulation weight fire extinguisher within proper arm reach of the instructor.

11. Tell the owner you want to see if there is any Babbitt in the oil, unscrew the plug an then accidentally drop it so that all the oil drains out of the sump. Then he has to give you a fresh filling of oil which will stake you until you can catch a passenger or student to finance further operations.

12. To try out the fabric just go around kicking at the wings and fuselage. If you are able to kick a dozen or so holes through the cover just don't buy it an if you can't kick holes in it buy the ship no matter what else is wrong with it. The owner will follow you around waving his hands an saying it has just been all recovered but don't pay no attention to him as that is hokum.

13. If the ship has this number on it anywhere, such as identification or mfrs. number, why don't buy it at all.

14. If the rudder is sort of warped and wavy don't worry about that. If it is bad it will just throw you off your course a bit but that doesn't make any difference as who cares where he is going in a Jenny?

15. Make sure all of the holes in the instrument board has instruments or dials of some sort in them. The instruments won't work of course, but it always impresses the passenger particularly if there is a woman to look the instruments over very careful with a worried look on your face and then smile an say everything is fine.

16. Offer him half what he wants for it. If he takes it there is something very wrong with the job, so then offer him quarter what he asks. If he argues about any price you happen to stick on just wave a dollar or two under his nose an he'll take it if he thinks your going to pay in real money. You can sometimes borrow the dollar or two from some one before you come to the field.

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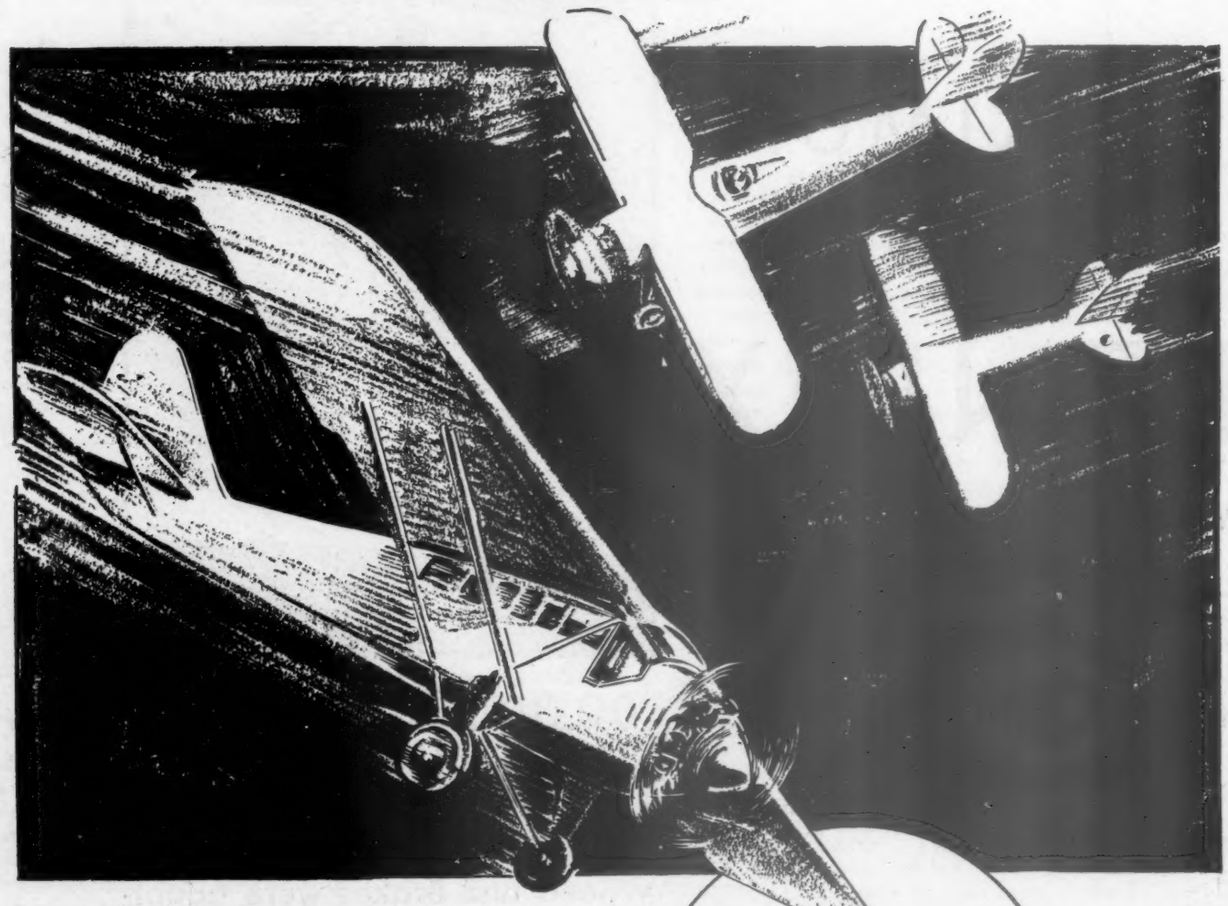

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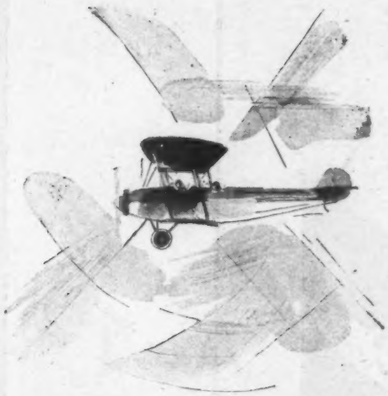

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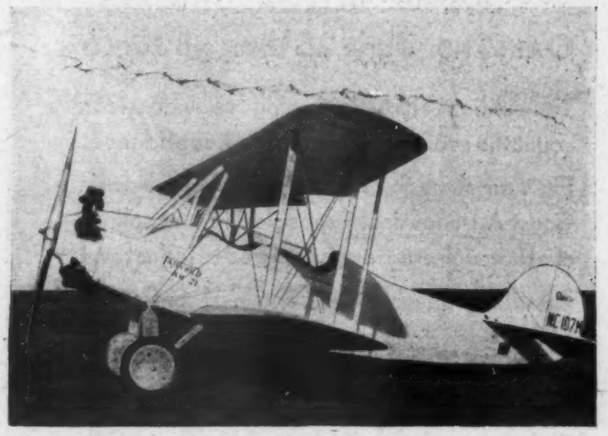
Performance: Top speed, 123 m.p.h. Climb, 800 ft. p.m.
DISPOSABLE LOAD, 885 LBS.

Specifications: Wright J-6, 165 h.p. engine and metal propeller. Oleo landing gear. Bendix brakes may be installed at slight additional cost. Air wheels with brakes also obtainable at slight extra cost. Note really complete equipment: airspeed indicator, altimeter, compass, dash gasoline gauge, booster magneto, tachometer, dual controls, brakes, oil pressure and temperature gauges, cockpit covers, engine cover, logbook, tools, first-aid kit, fire extinguisher, engine instruction book, wired for navigation lights. This plane can also be had with 165 h.p. Comet engine, which alters performance slightly and increases disposable load and economy. Price, with either engine, $6575 flyaway Farmingdale.



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Performance: Top speed, 113 m.p.h. Climb, 775 ft. p.m.
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KR-21 *Trainer*, $4125 flyaway Farmingdale

Specifications: Kinner 100 h.p. engine and wood propeller. Oleo landing gear. Bendix brakes may be installed at slight additional cost. Air wheels with brakes also obtainable at slight extra cost. Complete equipment: altimeter, gasoline gauge, booster magneto, tachometer, oil pressure and temperature gauges, dual controls, engine cover, tools, fire extinguisher, first-aid kit, engine instruction book, logbook, celluloid inspection windows at all control bearing points, detaching pan.
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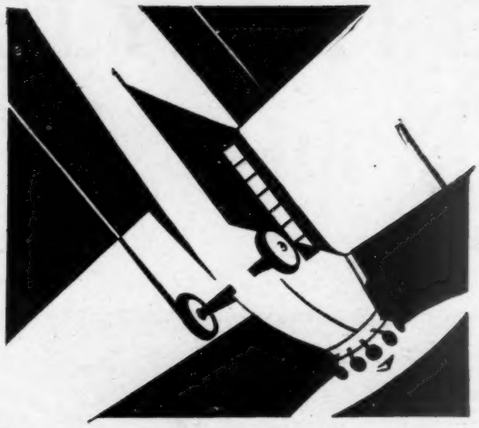

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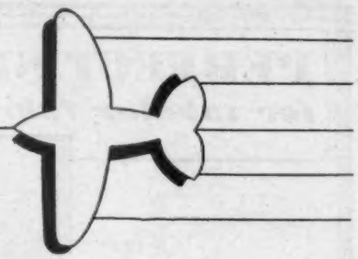

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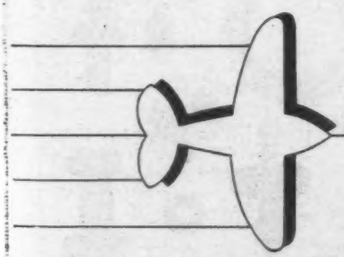

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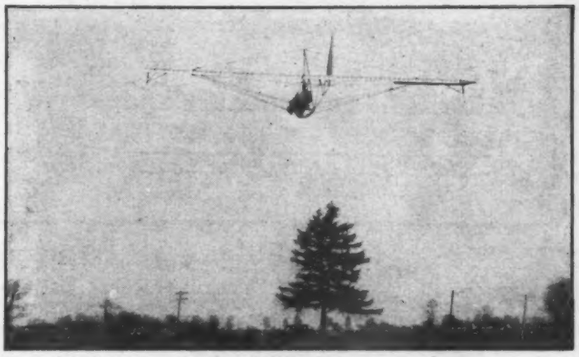

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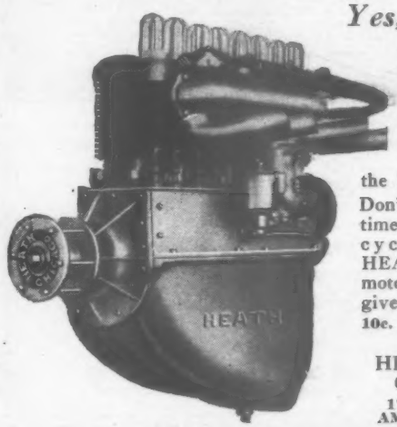

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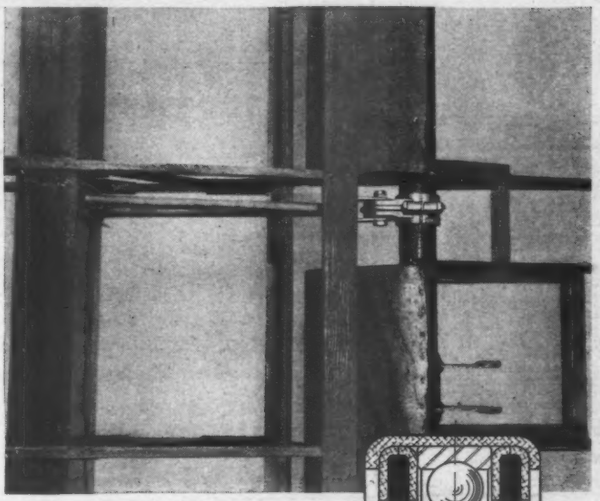

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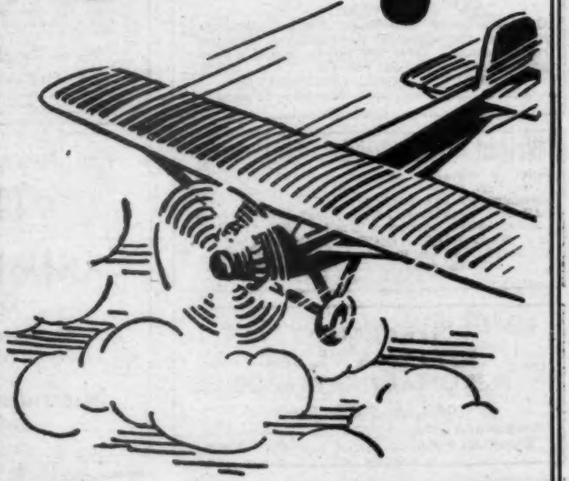

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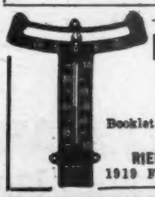

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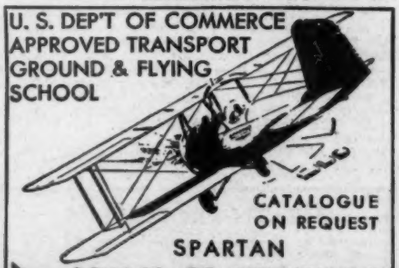

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FOR SALE: OX-5, OXX-6 and Hisso engines. Write for complete description. Heckman Machine Works, 4026 Lake Street, Chicago, Illinois.

FOR SALE: Ford overhauled J-5 motor, never used since overhauled at a real bargain. Make me an offer. H. D. Putnam, 106 South Fourth Street, Minneapolis, Minn.

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Overhauled 150 hp., Hisso	290
Model E Hisso, overhauled	390
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Warner School Motor	290
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Wasp, splendid condition	1250

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3—OX5 Curtiss.
1—Sixty Velie, 1—OXX6 Curtiss.
1—Kinner, 2—Warner-Scarabs.
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Trustee in Bankruptcy,
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LINDBERGH

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depended upon a

PRATT & WHITNEY
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